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Prevalence of Adverse Childhood Experiences and an Examination of Strengths-Based Attributes among American Indian and Alaska Native Communities

Antoinette Medina (Gabrielino Tongva), MPA, Kathleen Jack (Shoshone Paiute), MPH, Emily Beamon, PhD, Kelley Milligan, MPH, Jeffrey Thiele, PhD, Prashanti Manda, PhD, Somya Mohanty, PhD, and Allyson Kelley, DrPH

Abstract: *Adverse childhood experiences (ACE) are one of the leading causes of health disparities and inequities in American Indian and Alaska Native (AI/AN) populations. The purpose of this survey study was to create and pilot a Tribal ACE (TACE) tool that recognizes the cultural and community factors that AI/AN populations face that contribute to ACEs. Using a two-phase, mixed-methods, culturally-centered approach, we created a two-part tool. The first part consisted of the updated ACE items, while the second part of the tool assessed individual strengths-based attributes that may serve as protective factors following personal adverse experiences. Using three Tribal Health Programs (THP) in California, we piloted this tool among 516 AI/AN adults. We assessed ACEs, healthy coping, social support, resilience, cultural and community connections, and participant demographics. Using the updated, 23-item TACE questionnaire, participants had a total experience score ranging from 0-22. Women, participants who identified as another race in addition to AI/AN, and those with secondary education reported more ACEs. Individual strengths-based attributes also revealed that older AI/AN participants and those who only identified as AI/AN (compared to those identifying with additional races) had higher scores in resilience, coping, and culture and community connectedness. These findings support using the TACE tool in AI/AN populations as a valid and reliable means to document ACEs, resilience, coping, and culture and community connectedness.*

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INTRODUCTION

Adverse childhood experiences (ACEs) are often measured using a validated tool assessing experiences of abuse prior to the age of 18. Research regarding these traumatic experiences (emotional, physical, and sexual abuse, parental substance use, mental illness, incarceration, and/or divorce) documents a clear link between ACEs and poor health behaviors and disease as an adult (Felitti et al., 1998). Exposure to adverse experiences in childhood has been associated with increases in risk factors for ischemic heart disease, cancers, chronic lung disease, and liver disease in adulthood (Felitti et al., 1998); repeated exposure to ACEs is associated with an even greater risk of these already poor health outcomes. Considering risk factors to ACEs, higher ACE scores are often associated with being female, identifying as a racial or ethnic minority, or sexual minority (Giano et al., 2021).

While there is research to support the relationship of ACEs and poor health outcomes, less is known about the link among American Indians and Alaska Natives (AI/AN). Significant findings within AI/AN samples with ACEs are often overlooked or grouped into larger racial categories to allow for comparisons to larger referent groups (Giano et al., 2021); these studies also tend to have smaller samples of AI/ANs and are often limited in geographical location. In the largest sample of AI/ANs to date, Giano and colleagues (2021) examined 3,984 AI/AN participants and found that the current body of literature on ACEs underestimates the prevalence of adverse experiences among AI/AN populations. Among studies specifically examining AI/AN populations, researchers have found that ACE scores are 2.32 times higher than those individuals who identify as White, AI/AN females report higher ACEs than AI/AN males (Giano et al., 2021), ACEs are related to high-risk behaviors in adults with alcohol dependence (Koss et al., 2003), and parental ACEs were related to their own child's social-emotional problems through their parent's reported mental distress (Wurster et al., 2020).

The currently validated tool that is used to examine ACEs among U.S. populations examines trauma in an individualistic manner and does not consider the culture or context of an individual (Giano et al., 2021). Historically, AI/AN people are at an increased risk to experience ACEs as a function of their collective social, economic, historical, and cultural trauma.(Giano et al., 2021). Health risk factors for AI/ANs are often associated with intergenerational experiences

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of trauma including (but not limited to) colonialism, racism, marginalization, mass relocation, and the abuses of the boarding school systems. One study found that among AI/ANs reporting higher rates of historical trauma (ancestral loss of land, language, culture), they also experienced higher rates of depression, substance use, and suicide (Brockie et al., 2015). As it currently stands, the ACEs tool does not account for Native culture or their intergenerational trauma in a way that allows the AI/AN experience to be fully seen and understood. Assessing ACEs in Tribal communities is difficult because limited validated tools have been developed with AI/AN populations in mind (Kelley, Piccione, et al., 2019). Experiencing these compounding structural and systemic factors places AI/ANs at greater risk for smoking, alcohol abuse, drug abuse, depression, suicide, and general health-related quality of life issues (Warne et al., 2017). In order to provide appropriate context to an AI/AN-specific ACEs tool, one must consider including additional community and systemic context—like exposure to community violence, economic hardship, bullying, or experience with foster care (SmithBattle et al., 2021).

Exploring ACEs inherently focuses on negative experiences, while failing to acknowledge the protective factors an individual exhibits in the face of adversity. While AI/AN populations have experienced significant historical and cultural trauma, AI/AN people are strong, resilient, connected to their communities and culture, and have a long history of traditions, language, beliefs, and ceremonies that help them overcome negative events that happen in their lives. In working with AI/AN communities, many public health outreach efforts have begun to utilize a strengths-based approach, incorporating understanding resilience in the face of trauma (Hamby et al., 2023). Within the AI/AN community, *resilience* is considered as "the distinct AI/AN worldviews, beliefs, values, and practices that support individual and community resistance and positive transformation" (Oré et al., 2016, p. 136). This concept can be considered an intergenerational process that hinges on the community connection of sharing values, beliefs, and practices as a means of promoting strength and healing (Oré et al., 2016). Research on resilience has found that sharing similar, difficult experiences can improve family bonds and build community connection (Burnette et al., 2020). Lack of family or community connection and experiences with isolation (assessed within ACEs) is related to negative health outcomes and higher mortality rates (Holt-Lunstad et al., 2015). Research suggests that AI/AN family and community connections provide an important source of strength in the face of adversity, which can be directly related to increases in family cohesion and positive mental and physical health outcomes (John-Henderson et al., 2023; Palimaru et al., 2022). Among AI/AN peoples, cultural and community connectedness can serve as a protective factor in reducing

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depression and anxiety among adults, as well as substance misuse, marijuana use, and alcohol use—especially among youth (John-Henderson et al., 2023; Kelley, Witzel, et al., 2019).

Experiences with ACEs and their subsequent negative health outcomes are also impacted by one's own coping skills. Involving the ability to regulate one's emotions to decrease the effects of a stressor, positive coping skills are often related to having a strong sense of community and social support and is often directly related to positive health outcomes (Kerai et al., n.d.; Wilson et al., 2024). Especially among non-White communities, it is suggested that community-based resilience and support enhances coping skills, encouraging individuals to interpret adversity as something that is manageable, indirectly enhancing psychological well-being. This may suggest that the association between race, ethnicity, and the sense of community and belonging can directly impact positive health outcomes.

While understanding ACEs within Tribal communities is imperative to prevention and intervention efforts, utilizing a strengths-based approach (and assessing concepts like resilience, coping, and community connection) provides a more holistic and tailored approach that can help providers understand the individual as more than just their experiences with trauma. To address the need for a culturally-sensitive ACE tool, the California Rural Indian Health Board, Inc. (CRIHB), California Tribal Epidemiology Center (CTEC) developed a "Tribal Adverse Childhood Experiences" (TACE) survey to explore ACEs, as well as strengths-based attributes of AI/ANs in the domains of resilience, coping, and connection. The goal of this study was to develop and pilot a reliable and culturally-tailored tool that can be used to assess ACEs among AI/AN populations. The primary objective was to create culturally-tailored ACE items and pilot their reliability among a California AI/AN sample. Secondary objectives included exploring these newly assessed ACEs and their association with strengths-based attributes of resilience, coping skills, and culture and community connection.

METHODS

Design and Setting

The creation of the TACE survey had a three-phase, mixed-method, culturally-centered approach that included drafting the tool, implementing the tool, and validating the results. With community involvement and review, the TACE tool was created in 2019 and subsequently

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administered to three Tribal health programs (THPs) representing the Northern, Central, and Southern regions of California. Sites were selected based on past responses to the Tribal Behavioral Risk Factor Survey ACE data. The TACE tool was implemented organization-wide between 2020 and 2021. This survey study was approved by the institutional review board of the CRIHB. The authors followed CRIHB's requirements and ensured the research was culturally sensitive and relevant to AI/AN communities participating.

Developing the TACE Tool with Community Members

The first step in creating the TACE tool was examining a combination of previous publications and tools used among AI/AN communities and selecting questions from these tools that were deemed meaningful and culturally responsive. Previous AI/AN tools included the initial tool measured in the CDC-Kaiser Permanente ACE Study (CDC, n.d.) the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988), the Rosenberg Self-Esteem Scale (Rosenberg, 1965), the Circle of Courage and Positive Psychology Survey (Brendtro et al., 2005), the Brief Resilience Coping Scale (Sinclair & Wallston, 2004), the Cultural Connectedness Scale (Snowshoe et al., 2015), and the Cultural Resilience Scale (Kelley et al., 2018).

The study team met with AI/AN community members, THP staff, and tribal consultants to review the first draft of the TACE survey. This informal review process included in-person and virtual discussions around the need for a culturally balanced ACE tool. These individuals (N =10) were selected based on their Tribal affiliation and experience with administering ACEs within AI/AN communities. Over six months, the team met multiple times to finalize the TACE survey. Based on consensus from the expert panel, initial edits included removing questions that were not culturally sensitive and creating response options of "Don't Know" and "Prefer Not to Answer" for ACEs.

An example of revisions made include changes to demographic questions. Geographical location is essential to one's identity and wellbeing; as such, several questions on demographics were revised and edited. For example, the item "Are you AI/AN?" was revised. If the response was "No," people were asked if they had a family member who was AI/AN and what their relationship was with that person. AI/AN identity is recognized, but the role and importance of TACEs are not exclusionary; relatives and kinship systems are deeply embedded into histories and communities. Families are composed of varying Tribal affiliations, races, and ethnicities, not just AI/AN. Another revision was to the response options for adverse events. Questions regarding ACEs were revised from basic "yes" or "no" responses to the frequency of a given event.

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Community elders felt that understanding the frequency of adverse events (instead of a binary yes/no) would provide more information that could be used to understand the community experience and tailor interventions. For example, "*How often* did your parents or adults in your home ever slap, hit, kick, punch or beat each other up?" included response options of "more than once," "once," "never," "don't know/not sure," or "prefer not to answer."

Participants completing the TACE survey consisted of AI/AN Tribal community members, patients, and THP Providers; those over the age of 18 gave informed consent to participate. The authors relied on previous research and community involvement in the published research guidelines on how to modify tools and measures for diverse populations, with attention to language, culture, strengths, and resilience over deficits (Kelley, Piccione, et al., 2019; Stewart et al., 2012).

Measures

The final, culturally sensitive TACE survey consisted of 54 multiple-choice questions and one open-response text question. These questions were pulled from established measures based on consensus from the AI/AN community members, THP staff, and Tribal consultants. Questions explored ACEs, resilience, coping, cultural and community connections, and participant demographics. CTEC used previously validated questions and response scales when possible (see Appendix).

Demographic Characteristics

Ten questions were used to determine participants' self-reported race and ethnicity, age, gender identity, education level, employment status, and Tribal community affiliation.

Culturally-Tailored Tribal Adverse Childhood Experiences

The original ten items of the ACE tool (CDC, n.d.) were incorporated into the development of the culturally-tailored AI/AN Tribal ACEs questionnaire. Some original items were split into separate items ("Did you lose a parent through divorce, abandonment, death, or other reason" split into Divorce, Abandonment, and Death). An additional 13 culturally-tailored items were added to provide greater context and understanding of the AI/AN experience. Additional topics covered by these items included witnessing traumatic events, being treated poorly due to one's race or ethnicity, being bullied, and being in foster care. Response items included frequency options (*1 = Never; 2 = Once; 3 = A few times; 4 = Many times*), but for the purposes of this paper, endorsement

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of ACEs was coded dichotomously to indicate the presence or absence of exposure (Yes = 1/No = 0). Higher total scores indicated greater exposure to ACEs; alpha = .884.

Strengths-based Attributes

Resilience. Resilience was assessed using eight questions, rated on a 5-point Likert scale (*1 = Disagree, 5 = Agree*). Items were adapted from previous research, with measures focusing on social support, self-esteem, and meaning (Brendtro et al., 2005; Rosenberg, 1965; Zimet et al., 1988). Items included "I feel that I have many good qualities"; "I am motivated to work hard"; "My life has a purpose." Higher scores among participants were indicative of greater resilience in the face of adversity; alpha = .809.

Coping. Healthy coping was assessed using four questions adapted from previous research; measures focused on support, actions, and beliefs (Sinclair & Wallston, 2004). Items were rated on a 5-point Likert scale (*1 = Disagree, 5 = Agree*). Items included "I get emotional support from others"; "I take action to try to make the situation better"; "I turn to work or other activities to take my mind off things." Higher Coping scores were indicative of greater coping skills; alpha = .689.

Culture and Community Connectedness. This was assessed using 10 items adapted from the previous research (Kelley et al., 2018). All responses included a 5-point Likert scale with ratings of agreement or strength (*1 = Disagree to 5 = Agree; 1= Very Weak to 5 = Very Strong*). Measures focused on interest in finding out about AI/AN status, cultural knowledge and connections, language use, community attachment, and sense of community. Items included rating current and community connections related to cultural knowledge, Native language involvement, and sense of community and connections with others. Cronbach's alpha was .859.

Survey Administration

Three California THPs distributed the TACE tool to patients during routine healthcare visits or to community members as part of outreach prevention efforts. THPs used paper surveys, tablets embedded with the survey, and individual survey links via email using Qualtrics (an electronic survey platform). To be eligible for the survey, individuals were required to be over 18 at the time of the survey, provide written consent, and be active patients at a participating THP. Anyone under the age of 18 was excluded from the study. The survey was self-administered and took approximately 15 minutes to complete. To encourage participation and compensate individuals for their time, each respondent received a $25 gift card.

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Statistical Analyses

Descriptive statistics (means, standard deviations, frequencies) were used to summarize sample characteristics and study variables. Descriptive and multivariable analyses were conducted to examine the ACE scores of survey respondents. Group differences in scores (TACES, Strengths-based attributes: Resilience, Coping, Culture & Community Connectedness) were examined using parametric between-subjects analyses, including independent-samples *t* tests, and one-way ANOVA. Assumptions of normality, homogeneity of variance, and linearity were assessed prior to conducting analyses. Statistical significance was evaluated at an alpha level of .05.

Based on total TACE scores, a median split determined two groups: "low" (≤ 6) and "high" (≥7) experiences of TACEs. A logistic regression was conducted to examine predictors of membership to the high or low group using total scores of Strengths-Based Attribute subscales and relevant demographic variables. A random forest model was also conducted to examine individual item importance from the total subscales when predicting TACE grouping (high or low).

RESULTS

A total of 516 patients completed the TACE survey. The characteristics of respondents are listed in Table 1. Participants ranged in age from 18 to 88, most of whom were female (66%), high school graduates (52%), and employed at least part-time (61%). Nearly 95% of participants identified as American Indian/Alaska Native; 87% were AI/AN from California, and 25% identified with another race in addition to AI/AN.

Culturally-Tailored Tribal Adverse Childhood Experiences

Twenty-three items assessed culturally-tailored exposure to ACEs for AI/ANs. Because each item contributed either 0 (no exposure) or 1 (exposure), the total ACE score could range from 0 to 23. The median ACE score was seven, ranging from 0 to 21. This median was used to determine groupings into a "low" or "high" TACE experience group (henceforth referred to as 'group'). The top five ACEs reported in surveys included being treated badly or unfairly because of one's own race/ethnicity (64%); living with someone who has a problem drinking (58%); experienced parent/adult swearing, insults, or put downs (58%); seeing or hearing someone being beaten up, stabbed, or shot (56%); and being bullied by a peer or classmate (55%; Table 2).

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Table 1.
Characteristics of AI/AN TACE survey respondents, 2020-2021 (N = 516)

Participant Characteristics		N (%)
Age (N = 490)		
	18 to 24	62 (12.6)
	25 to 34	131 (26.8)
	35 to 44	114 (23.2)
	45 to 54	76 (15.2)
	55 and older	107 (21.4)
Gender		
	Female	342 (66.3)
	Male	163 (31.6)
	Two-Spirit	10 (1.9)
Education		
	Elementary	8 (1.6)
	Some high school	75 (14.5)
	High school graduate	266 (51.6)
	College graduate	93 (18.0)
	Other	74 (14.3)
Employment		
	Employed Full-Time	276 (53.5)
	Employed Part-Time	40 (7.8)
	Unemployed and currently looking for work	95 (18.4)
	Unable to work	50 (9.7)
	Retired	33 (6.4)
	Self-Employed	22 (4.3)
	Student	15 (2.9)
	Taking care of home and/or family	44 (8.5)
Hispanic		
	No	421 (81.6)
	Yes	91 (17.6)
Are you AI/AN?		
	No	25 (4.8)
	Yes	488 (94.6)
Are you California AI/AN?		
	No	67 (13.0)
	Yes	449 (87.0)
Do you identify with Another Race?		
	Not Applicable	44 (8.5)
	No, I identify only as AI/AN	299 (57.9)
	Yes, I also identify with other racial groups	130 (25.2)
Which is also your race?		
	Asian	6 (1.2)
	Black or African American	5 (1.0)
	Native Hawaiian or Pacific Islander	15 (2.9)
	Other	30 (5.8)
	White	81 (15.7)
How many people under 18 years old are living in your home?		
		Range = 0-8
		Median = 1.00

Note. California AI/AN included 17 California counties and over 30 California Tribes

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Table 2.
Most Frequently Endorsed Tribal ACEs (N = 516)

Now, looking back to before you were 18 years of age…	Yes	No	Missing
2w. Did you feel safe in the neighborhoods/communities you grew up in?	101 (21.2)	**375 (78.8)**	40
2p. How often did you feel that you were treated badly or unfairly because of your race or ethnicity?	**324 (64)**	182 (36)	10
2t. Did you feel people in your neighborhoods/communities looked out for each other, stood up for each other, and could be trusted?	151 (36.5)	**263 (63.5)**	102
2b. Did you live with anyone who has a problem with drinking?	**292 (58.2)**	210 (41.8)	14
2k. How often did a parent or adult in your home ever swear at you, insult you, or put you down?	**270 (57.9)**	196 (42.1)	50
2o. How often, if ever, did you see or hear someone being beaten up, stabbed, or shot in real life?	**278 (55.9)**	219 (44.1)	19
2q. How often were you bullied by a peer or classmate?	**279 (54.8)**	230 (45.2)	7
2c. Did you live with anyone who had a problem using drugs, including prescription drugs?	222 (46.1)	260 (53.9)	34
2i. How often did your parents or adults in your home ever hit, punch, beat, or threaten to harm each other?	202 (45.2)	245 (54.8)	69
2e. Did you lose a parent through separation or divorce?	219 (43.3)	287 (56.7)	10
2d. Did you live with anyone who served time or was sentenced to serve time in a prison, jail or other correctional facility?	212 (42.7)	284 (57.3)	20
2j. How often did a parent or adult in your home ever hit, beat, kick, or physically hurt YOU in any way?	195 (42)	269 (58)	52
2a. Did you live with anyone who was depressed, mentally ill, or attempted suicide?	171 (37.6)	284 (62.4)	61
2r. Did your family sometimes cut the size of meals or skip meals because there was not enough money in the budget for food?	168 (36.4)	294 (63.6)	54
2g. Did you lose a parent through death?	177 (34.7)	333 (65.3)	6
2h. Did you experience unwanted sexual contact (such as fondling or oral/anal/vaginal intercourse/penetration)?	146 (30)	341 (70)	29
2l. How often did anyone at least 5 years older than you (or an adult) ever touch you sexually?	138 (29.4)	332 (70.6)	46
2f. Did you lose a parent through abandonment?	138 (27.8)	358 (72.2)	20
2m. How often did anyone at least 5 years older than you (or an adult) try to make you touch them sexually?	125 (25.6)	364 (74.4)	27
2s. Did you feel that you didn't have enough to eat, had to wear dirty clothes, or had no one to protect or take care of you?	125 (25.5)	366 (74.5)	25
2v. Did you feel that no one in your life loved you or thought you were special?	101 (22)	359 (78)	56
2n. How often did anyone at least 5 years older than you (or an adults) force you to have sex?	91 (18.6)	398 (81.4)	27
2u. Were you ever in foster care?	72 (14.5)	423 (85.5)	21

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We examined differences in TACE scores across different demographic groups. Women (M = 9.20, SD = 5.11) had significantly higher TACE scores than men (M = 8.05, SD = 4.39), t (366.21) = -2.51, p = .009. There were no significant differences among age groupings and total TACE scores. There was a significant difference in TACE scores across different educational groups. TACE scores were the lowest for participants who completed elementary and some high school (M = 7.59, SD = 5.43), followed by participants who were high school graduates (M = 8.51, SD = 4.68), and then college graduates and above (M = 10.12, SD = 4.75), F (2, 513) = 9.25, p < .001. Post hoc Tukey tests revealed significant differences between college compared to high school graduates (p = .002), as well as college compared to elementary/some high school (p <.001). Participants were asked to report if they identified with another race in addition to being AI/AN (Not Applicable; "No, I identify only as AI/AN;" "Yes, I also identify with other racial groups"). Examining the participants who reported yes (n = 130) or no (n = 293-299), those who identified as being another race (M = 9.97, SD = 4.90) in addition to AI/AN had significantly higher TACE scores than those who did not identify with an additional race (M = 8.72, SD = 4.77), t (427) = -2.47, p = .014.

Strengths-based Attributes

Means and standard deviations are presented for each individual item of the strengths-based attributes subscales of Resilience, Coping, and Culture and Community Connectedness; Cronbach's alpha are also presented (Table 3).

There were no significant gender differences when examining the strengths-based attributes. There were no significant differences in these subscales among the three aforementioned educational groupings. Participants who also identified with another race in addition to being AI/AN (M = 34.88, SD = 5.31) reported significantly lower Resilience scores compared to participants not identifying with an additional race (M = 36.03, SD = 4.91), t (422) = 2.17, p = .03. Participants identifying with an additional race to AI/AN had significantly lower Culture scores (M = 33.70, SD = 6.82) than those identifying only as AI/AN (M = 36.77, SD = 7.27), t (425) = 4.09, p < .001. Additionally, among Coping total scores, there was a trend toward significance, with those identifying with an additional race to AI/AN having slightly lower scores (M = 17.01, SD = 2.96) than those only identifying as AI/AN (M = 17.54, SD = 2.77), t (420) = 1.76, p = .07.

There were significant differences in participants' ratings of strengths-based attributes for those over and under the age of 35. Among participants over 35 (M = 36.11, SD = 4.88), they had

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significantly higher Resilience scores than their younger counterparts (M = 34.76, SD = 5.50), t (372.92) = -2.75, p = .006. Older participants (M = 17.59, SD = 2.69) had significantly higher Coping scores than younger participants (M = 16.83, SD = 3.08), t (369.83) = -2.78, p = .003. Those over 35 (M = 36.45, SD = 7.84) also had significantly higher Culture and Community Connectedness scores than those under 35 (M = 34.66, SD = 7.33), t (485) = -2.53, p = .006.

Table 3.
Descriptives of Strengths-Based Attribute Subscales (N = 516)

Item	Mean (SD)
Resilience	Alpha = .809
1. I feel that I have many good qualities	4.65 (.69)
2. On the whole, I am satisfied with myself	4.33 (1.02)
3. I can talk about my problems with my family	4.30 (1.27)
4. There is a special person who is around when I am in need	4.37 (1.08)
5. I feel comfortable making friends and forming relationships with others	4.25 (1.16)
6. I am motivated to work hard	4.66 (.72)
7. I show respect and concern for others	4.84 (.48)
8. My life has a purpose	4.73 (.72)
Coping	Alpha = .689
9. I turn to work or other activities to take my mind off things.	4.39 (.97)
10. I get emotional support from others.	4.24 (1.01)
11. I take action to try to make the situation better.	4.56 (.75)
12. I try to find comfort in my religious, traditional, and/or spiritual beliefs.	4.31 (1.07)
Culture & Community	Alpha = .859
13. I am interested in learning more about my AI/AN culture.	4.71 (.69)
14. I am proud to be an AI/AN.	4.91 (.41)
15. I have participated in at least one of the following family/traditional activities…	4.71 (.85)
Please select the rating that best describes your **current connections** with the following	
16. My cultural knowledge and connections	3.61 (1.17)
17. My traditional native language involvement and usage	2.37 (1.30)
18. My sense of community and attachment to my community	3.35 (1.19)
19. My connections with people outside of my age group	3.70 (1.12)
Please select the rating that best describes your **community's connections** with the following	
20. Cultural knowledge and connections	3.33 (1.16)
21. Traditional native language involvement and usage	2.43 (1.25)
22. Sense of community	3.35 (1.11)

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Logistic Regression

A logistic regression was conducted to examine variables that best predicted belonging to the low or high TACE categorization (i.e., being in high TACE group = 1, where low TACE group = 0). Dependent variables included total scores of Resilience, Coping, Culture and Community Connectedness, as well as demographic variables of gender, age, education, and if participants identified with another race other than AI/AN. The overall model was significant, χ^2 (7) = 35.16, $p < .001$, explaining 11% of the data. As shown in Table 4, Resilience was a significant predictor of TACE group membership (B = -0.156, SE = 0.035, $p < .001$, OR = 0.856), indicating that higher resilience was associated with lower odds of being in the high TACE group. Specifically, each one-unit increase in resilience was associated with a 14.4% decrease in the odds of high TACE group membership. Coping was also a significant predictor (B = 0.124, SE = 0.054, $p = .023$, OR = 1.132), such that higher coping scores were associated with higher odds of being in the high TACE group. Each one-unit increase in coping was associated with a 13.2% increase in the odds of higher TACE group membership. Level of education significantly predicted TACE group membership (B = 0.375, SE = 0.159, $p = .018$, OR = 1.455), indicating that higher levels of education were associated with greater odds of being in the high TACE group. Specifically, each increase in education level corresponded to a 45.5% increase in the odds of higher TACE group membership.

Table 4.
Logistic Regression Predicting TACE Group Membership

	B	S.E.	Wald	df	Sig	OR	95% CI
Resilience Total	-0.16	0.04	19.31	1	<.001***	0.856	0.80, .92
Coping Total	0.12	0.05	5.20	1	0.023*	1.132	1.02, 1.26
C & CC Total	0.02	0.02	1.33	1	0.249	1.019	0.99, 1.05
Age	0.000	0.01	0.003	1	0.958	1.00	0.99, 1.01
Gender	0.25	0.22	1.29	1	0.255	1.29	0.93, 2.00
Level of Education	0.38	0.16	5.59	1	0.018*	1.455	1.07, 1.99
Another Race	0.34	0.19	3.36	1	0.067	1.41	0.98, 2.04

Note. C&CC = Culture & Community Connectedness; Another Race = participants identifying as another race in addition to AI/AN; OR = Odds Ratio; CI = Confidence Interval; *p < .05; **p< .01; ***p< .001

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As this study involved piloting both the TACE items and strengths-based attributes subscales, we further investigated the individual items of Resilience and Coping to examine if any individual items were especially predictive of TACE group membership. A random forest model was conducted and revealed that items assessing satisfaction with self (*B* = -.68), comfort forming relationships *(B* = -.53), life having a purpose (*B* = -.57), and talking with family about problems (*B* = -.22) were predictive of low TACE group membership. Items of having good qualities (*B* = .67), trying to find comfort in religion/spiritual beliefs (*B* = .17), and making connections outside of one's age group (*B* = .14) were predictive of high TACE group membership.

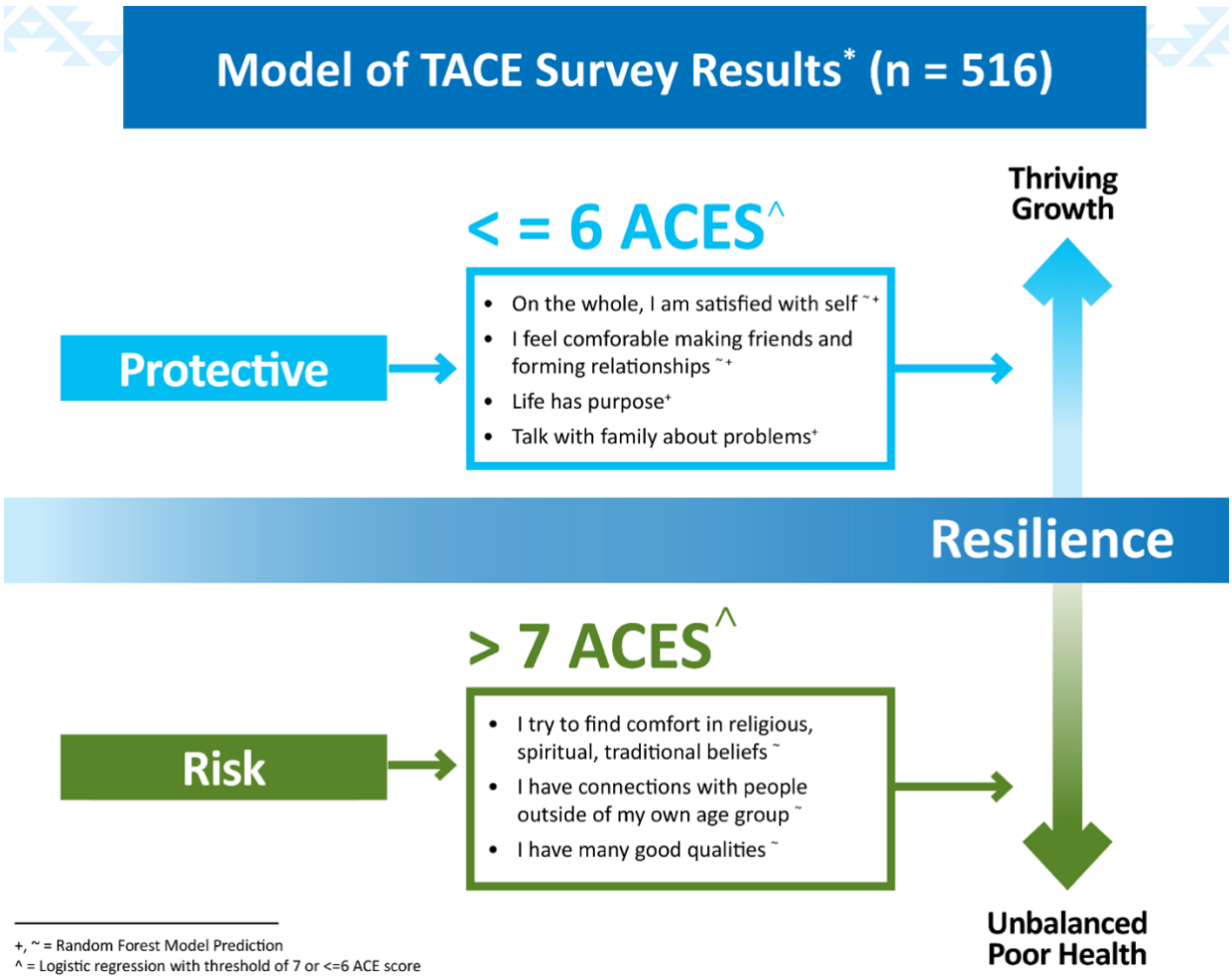


Figure 1. CRIHB TACE Scale Risk and Protective Factors

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DISCUSSION

This study provides the initial piloting of the updated Tribal Adverse Childhood Experiences (TACES) tool. The use of TACES with a large, California AI/AN sample provides support for the initial reliability and initial validity of using this tool with other AI/AN samples. The community-based participatory research process used to adapt the existing ACEs tool added to the content validity of survey questions and should be replicated in the future with other tribal communities (for the survey used, see Appendix) (Kelley et al., 2022). A significant limitation pointed out by previous research is that the ACEs tool has been used with AI/AN populations but is not culturally centered or framed in a cultural context relevant to AI/AN individuals and diverse cultural values and practices (Giano et al., 2021). We have shown that expanding the original ACEs tool has resulted in a number of additional adverse experiences had by AI/AN people. It was made clear that the AI/AN community within our sample have been significantly impacted by many of the childhood experiences listed in the updated version of the ACEs. Only 2% of the sample reported having had zero of the experiences listed in the updated TACEs list. This shows the need for an expansion of the original list, especially as it relates to the unique experiences of AI/AN individuals.

Examining the results of TACEs revealed significant gender differences, as well as differences among racial identification, and education level. Women, participants who identified as another race in addition to AI/AN, and those with secondary education reported having more ACEs. This is consistent with previous literature that suggests that women and members of other disenfranchised groups were likely to experience more adverse childhood events (Wurster et al., 2020). Future prevention efforts can be tailored through an intersectional lens and understanding that membership to multiple minority groups (gender minority, sexual orientation minority, additional racial groups) result in greater likelihood to have had extensive trauma histories, that will likely need to be addressed in medical or psychological care. Or, that trauma-informed providers need to be mindful of the complex trauma history that individuals who are members of multiple groups likely have.

As an initial exploration into the TACE data, we utilized a median split to examine groups of “high” and “low” TACE scores. This was done being mindful of how the tool might be used in Tribal communities (i.e., using categorizations in which scores could fall above or below a given threshold). We explored initial results and associations of these higher and lower TACE scores.

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Higher resilience scores were indicative of belonging to the lower TACE group. Resilience scores may be serving as a protective role, whereas those with higher resilience scores were less likely to experience adverse events, or classify them as adverse; this could also be a function of greater adaptive functioning and reduced vulnerability to adverse outcomes. In contrast, we found that higher levels of Coping were associated with membership to the higher TACE group. AI/AN individuals who have experienced high levels of ACEs may have developed and report stronger coping skills as a function of their personal experiences. This continues to make the case for exploring strengths-based attributes alongside ACEs, as many AI/AN individuals are experiencing factors that might serve as protective (or risk) to experiencing these events. Future prevention efforts may also consider educational efforts aimed at promoting resilience and coping skills as a means to protect against the effects of adverse experiences from childhood.

We also found that those belonging to the higher TACE group found comfort in their religious, spiritual, and traditional beliefs. This aligns with AI/AN concepts that healing from trauma requires growth that often comes with a connection to the Creator or a higher purpose (Kelley & BigFoot, 2024). Higher ACE scores were also associated with intergenerational connections. Individuals who have experienced higher levels of trauma likely seek the support of elders, aunties, and extended kinship systems beyond their age groups. One Tribal elder and clinical psychologist said, “This [support] is how people can get on the other side of healing.” Two statements were associated with lower ACE scores, self-satisfaction, and healthy relationships; both are anchors of a balanced and healthy life.

Participants’ scores on measures of Resilience and Coping remained relatively high (means closer to 5). However, among the items developed to assess Culture and Community Connectedness, there was a greater range of scores from participants. For example, mean scores for individual traditional Native language involvement and usage, and for community traditional Native language involvement and usage, were significantly lower than for all other items. Colonization, cultural erasure, boarding schools, land loss, premature deaths of elders, and mass genocide have been well documented as factors that contribute to the loss of Native language and usage (Smallwood et al., 2021). To encourage and improve cultural and community connection, future outreach efforts may want to continue emphasizing bringing back culture, instill values and traditions in our young people, and maintain the language and stories of our ancestors. Within these languages, there are sacred teachings and gifts that will heal our people. Other lower mean

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scores were also noted, particularly in cultural knowledge and connections, sense of community, and attachment to community. The loss of ancestral homelands and reservation/rancheria eras has taken much of the traditional family and community unit away. Many AI/ANs are forced to leave their Tribal communities in search of a better life, quality education and health care, and greater opportunities for their future (Walls & Whitbeck, 2012). While participants in this study are proud to be AI/AN and regularly participate in family and traditional activities, more opportunities are needed for them to learn their Native language, practice ceremonies, and engage with other AI/ANs as a community. These opportunities for cultural engagement and connection may also be fostered by Urban Indian Health areas where many AI/AN people reside (Allen et al., 2022; Herron & Venner, 2023; Kelley et al., 2018).

Strengths & Limitations

The study team acknowledges the strengths this study. First, the TACE survey had acceptable internal consistency and high Cronbach's alphas, suggesting that this tool is reliable and likely valid among similar samples. Second, the sample size was relatively large, which allowed for a rigorous analytical approach that is often difficult to achieve in many Tribal communities due to small populations and samples.

However, there are a few limitations that should be noted. Given the cross-sectional nature of the data, causal conclusions cannot be drawn, and future research should explore the mechanisms underlying this relationship. Social desirability may have occurred when examining the high scores among the Resilience and Coping subscales. In some cases, as many as 94% of participants agreed with individual items, suggesting a ceiling effect for some items. This could impact our ability to understand Resilience and Coping more deeply, since most participants agreed with each statement (and the subscale as a whole). While the purpose was to provide categorical cutoffs for prevention efforts, future studies can examine predictive ability of variables with TACES on a total score (and not a binary high/low group). Future studies will assess the factor structure of TACES and the strengths-based attributes subscales to determine if these items are adequate to continue using among samples of AI/ANs, if items need to be dropped or amended, and what domains are assessed within these new items. Last, although the sample size was relatively large, these individuals do not represent all AI/ANs, communities, or cultural perspectives of the 110 federally recognized Tribes in California or the 577+ Tribes in the United

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States. Future work should explore the use of the TACE tool in other communities to ensure that the experiences of AI/AN peoples are being fully captured with this newly validated tool.

CONCLUSION

This study aimed to establish the TACE survey's validity and reliability for use in Tribal communities. This is the first-ever, Tribal-specific tool used to measure ACEs while stressing the importance of culture and context in its assessment. We also presented the importance of balancing the assessment of ACEs with strengths-based attributes of resilience, community, and connections. The results presented here provide further evidence to explore the effects of Tribal ACEs on health and well-being. Through the updated TACE survey, providers, programs, and communities will be better equipped to develop and implement prevention and intervention strategies that address ACEs and build on community strengths. Use of the TACE tool can serve as a culturally-responsive, unifying framework to promote new trauma-informed care practices that heal and restore well-being in AI/AN populations.

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CONFLICT OF INTEREST

The authors declare no potential conflicts of interest.

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AUTHOR INFORMATION

Antoinette Medina (Gabrielino Tongva), MPA, is Deputy Director at the California Rural Indian Health Board in Roseville, CA.

Kathleen Jack (Shoshone Paiute), MPH, is Director of Public Health at the California Rural Indian Health Board in Roseville, CA.

Emily Beamon, PhD, is a Clinical Methodologist at Allyson Kelley & Associates PLLC in Sisters, OR.

Kelley Milligan, MPH, is a Senior Evaluation Specialist at Allyson Kelley & Associates PLLC in Sisters, OR.

Jeffrey Thiele, PhD, is a Data Specialist at Fort Peck Community College and a consultant at Allyson Kelley & Associates PLLC in Sisters, OR.

Prashanti Manda, PhD, is an Associate Professor in the Department of Computer Science at the University of Nebraska Omaha and a consultant at Allyson Kelley & Associates PLLC in Sisters, OR.

Somya Mohanty, PhD, is a consultant at Allyson Kelley & Associates PLLC in Sisters, OR.

Allyson Kelley, DrPH, is Principal Consultant at Allyson Kelley & Associates PLLC in Sisters, OR.

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APPENDIX

TACE Survey

Tribal Adverse Childhood Experiences (ACEs) Survey

Survey Instructions: Please read each question carefully. Sections are separated by titles with a blue header. You may skip any questions you do not want to answer. The results from this survey will be kept confidential and are soley for the purpose of developing strategies, resources and trainings to address adverse childhood experiences in your community.

Section 1: Demographics

1a. Which best describes your gender identity?

- ○ Male
- ○ Female
- ○ Two-spirit
- ○ Other: (e.g., gender fluid, non-binary)

1b. What is your highest level of education?

- ○ Elementary
- ○ Some high school
- ○ High school graduate
- ○ College graduate
- ○ Other(specify): _____

1c. What is your current employment status?

- ○ Employed full time
- ○ Employed part time
- ○ Unemployed and currently looking for work
- ○ Student
- ○ Retired
- ○ Taking care of home and/or family
- ○ Self-employed
- ○ Unable to work

1d. What is your age? Specify: _____

If you are not 18 or older please stop and give the survey to the staff member onsite

1e. How many people under the age of 18 years currently live in your household?
Specify: _____

1f. Do you identify as Hispanic, Latino/a, or Spanish?

- ○ Yes
- ○ No

1g. Are you a California Indian?

- ○ Yes
- ○ No, *please see question 1i.*

1h. If you are California Indian, please list the tribe that you are most closely affiliated with. Specify:
_____

1i. Are you American Indian/Alaska Native?

- ○ Yes
- ○ No →

If no, do you have a family member who is American Indian/Alaska Native? If so, please list your relationship with this person: _____

1j. If yes, in addition to American Indian/Alaska Native, do you identify with other racial groups?

- ○ No, I identify only as American Indian/Alaska Native
- ○ Not Applicable
- ○ Yes, I also identify with other racial groups →

If yes, which one or more of the following would you say is also your race? (Select all that apply)

- ☐ White
- ☐ Black or African American
- ☐ Asian
- ☐ Pacific Islander

Other: (specify)_____

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Section 2: Adverse Childhood Experiences

This section asks about events that may have happened during your **childhood**. This section contains sensitive questions and some people may feel uncomfortable answering the questions.

As with the rest of the survey, you can skip any questions you do not want to answer. Afterward, if you would like to talk about any of these events with anyone, please see the resource list. It contains contact information on several organizations that can provide help.

Now, looking back to before you were 18 years of age…	Yes	No	Don't Know/Not sure	Prefer not to answer
2a. Did you live with anyone who was depressed, mentally ill, or attempted suicide?	○	○	○	○
2b. Did you live with anyone who had a problem with drinking?	○	○	○	○
2c. Did you live with anyone who had a problem using drugs, including prescription drugs?	○	○	○	○
2d. Did you live with anyone who served time or was sentenced to serve time in a prison, jail or other correctional facility?	○	○	○	○
2e. Did you lose a parent through separation or divorce?	○	○	○	○
2f. Did you lose a parent through abandonment?	○	○	○	○
2g. Did you lose a parent through death?	○	○	○	○
2h. Did you experience unwanted sexual contact (such as fondling or oral/anal/vaginal intercourse/penetration)?	○	○	○	○

How often did these events occur before the age of 18…	More than Once	Once	Never	Don't know/Not Sure	Prefer not to answer
2i. How often did your parents or adults in your home ever hit, punch, beat, or threaten to harm each other?	○	○	○	○	○
2j. How often did a parent or adult in your home ever hit, beat, kick, or physically hurt **you** in any way?	○	○	○	○	○
2k. How often did a parent or adult in your home ever swear at you, insult you, or put you down?	○	○	○	○	○
2l. How often did anyone at least 5 years older than you or an adult, ever touch you sexually?	○	○	○	○	○

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How often did these events occur before the age of 18…	Many times	A few times	Once	Never	Prefer not to answer
2m. How often did anyone at least 5 years older than you or an adult, try to make you touch them sexually?	○	○	○	○	○
2n. How often did anyone at least 5 years older than you or an adult, force you to have sex?	○	○	○	○	○
2o. How often if ever, did you see or hear someone being beaten up, stabbed or shot in real life?	○	○	○	○	○
2p. How often did you feel that you were treated badly or unfairly because of your race or ethnicity?	○	○	○	○	○
2q. How often were you bullied by a peer or classmate?	○	○	○	○	○

Now, looking back to before you were 18 years of age…	Yes	No	Don't know	Prefer not to answer
2r. Did your family sometimes cut the size of meals or skip meals because there was not enough money in the budget for food?	○	○	○	○
2s. Did you feel that you didn't have enough to eat, had to wear dirty clothes, or had no one to protect or take care of you?	○	○	○	○
2t. Did you feel people in your neighborhoods/communities looked out for each other, stood up for each other, and could be trusted?	○	○	○	○
2u. Were you ever in foster care?	○	○	○	○
2v. Did you feel that no one in your life loved you or thought you were special?	○	○	○	○
2w. Did you feel safe in the neighborhoods/ communities you grew up in?	○	○	○	○

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Section 3: Resilience

This section asks about your **current situation**. Please take some time to reflect and complete each item on the survey below. There are no wrong or right answers.

Please select how much you agree or disagree with the following statements:

	Agree	Somewhat Agree	Do not agree or disagree	Somewhat disagree	Disagree	Prefer not to answer
3a. I feel that I have many good qualities.	o	o	o	o	o	o
3b. On the whole, I am satisfied with myself.	o	o	o	o	o	o
3c. I can talk about my problems with my family.	o	o	o	o	o	o
3d. There is a special person who is around when I am in need.	o	o	o	o	o	o
3e. I feel comfortable making friends and forming relationships with others.	o	o	o	o	o	o
3f. I am motivated to work hard.	o	o	o	o	o	o
3g. I show respect and concern for others.	o	o	o	o	o	o
3h. My life has purpose.	o	o	o	o	o	o

Please select how much you agree or disagree with the following statements about **coping with stress**:

	Agree	Somewhat Agree	Do not agree or disagree	Somewhat Disagree	Disagree	Prefer not to answer
3i. I turn to work or other activities (such as walking, exercise, or gardening) to take my mind off things.	o	o	o	o	o	o
3j. I get emotional support from others.	o	o	o	o	o	o
3k. I take action to try to make the situation better.	o	o	o	o	o	o
3l. I try to find comfort in my religious, traditional and/or spiritual beliefs.	o	o	o	o	o	o

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Section 4: Culture & Community

The following set of questions ask about your **American Indian/Alaska Native culture** and **your community**. For question 4, the word "community" means a place where you live and share common characteristics or customs with other people nearby.

Please select how much you agree or disagree with the following statements:

	Agree	Somewhat Agree	Do not agree or disagree	Somewhat Disagree	Disagree	Prefer not to answer
4a. I am interested in learning more about my American Indian/Alaska Native culture.	o	o	o	o	o	o
4b. I am proud to be American Indian/Alaska Native.	o	o	o	o	o	o
4c. I have participated in at least one of the following family/traditional activities, including but not limited to: *Beading, Big Times, Pow Wows, hunting, hand or stick games, basket weaving, dancing, drumming, fishing, gathering traditional foods, and berry picking.*	o	o	o	o	o	o

Using the scale, please select the rating that best describes **your current connections** with the following:

About Me…	Very Strong	Strong	Average	Weak	Very Weak	Prefer not to answer
4d. My cultural knowledge and connections	o	o	o	o	o	o
4e. My traditional native language involvement and usage	o	o	o	o	o	o
4f. My sense of community and attachment to my community	O	O	O	O	O	O
4g. My connections with people outside of my own age group	o	o	o	o	o	o
About My Community…	**Very Strong**	**Strong**	**Average**	**Weak**	**Very Weak**	**Prefer not to answer**
4h. Cultural knowledge and connections	o	o	o	o	o	o
4i. Traditional native language involvement and usage	o	o	o	o	o	o
4j. Sense of community	O	O	O	O	O	O

Using the scale, please select the rating that best describes **your community's connections** with the following:

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5. Please provide any additional comments you would like to share:

End of Survey



********THANK YOU********

Behavioral Health Contact Information:
Phone: XXX-XXX-XXXX
Email: xxx@xxx.org



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The Burden of Depressive Symptoms in a Cohort of American Indians During the COVID-19 Pandemic: The Strong Heart C4R Study

Marina Chen, MS, Heather Willmott, MS, Megan Eisele, MS, Asma A Sharaf, MS, Elizabeth C. Oelsner, MD, DrPH, Pallavi Balte, PhD, Shelley A Cole, PhD, Jason G Umans, MD, PhD, Tauqeer Ali, PhD, Amanda Fretts (Mi'kmaq Eel Ground First Nation), PhD, Amanda Janitz (Choctaw Nation of Oklahoma), PhD, Michael Anderson, PhD, and Ying Zhang, MD, MS, PhD

Abstract: *Depression increased during the COVID-19 pandemic, but little is known about this phenomenon in American Indian communities. We aimed to examine the prevalence and severity of depressive symptoms before and during the pandemic and identify associated factors. Strong Heart Study participants who completed the 10-item Center for Epidemiological Studies Depression Scale (CES-D-10) at both the baseline and follow-up exams were included in this analysis (n=1,013). Depressive symptoms were defined as a CES-D score ≥10. Univariable and multivariable analyses examined associations between covariates and depressive symptoms, adjusting for familial relatedness. Linear mixed models evaluated longitudinal changes in CES-D scores. The prevalence of depressive symptoms was approximately 22% pre-pandemic and 24% during the pandemic. Among participants without baseline depressive symptoms, self-reported COVID-19 infection was associated with significantly increased odds of experiencing depressive symptoms during the pandemic (OR: 1.76, 95% CI: 1.21, 2.56). After covariate-adjustment, mean CES-D scores did not change significantly during the pandemic (mean difference = 0.30, 95% CI: -0.16, 0.76). The impact of self-reported COVID-19 infection on the odds of experiencing depressive symptoms during the pandemic varied depending on whether individuals had depressive symptoms at baseline. These results provide evidence for targeted depression intervention in American Indians.*

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INTRODUCTION

Depression is a major mental health disorder that is known to be affected by many factors, including age (Zhang et al., 2018), sex (Kiely et al., 2019; Salk et al., 2017), smoking (Breslau et al., 1998), alcohol use (Nunes, 2023), socioeconomic status (Packness et al., 2025), genetics (Zięba et al., 2023), other mental health conditions like anxiety (Jacobson & Newman, 2017), and physical health conditions such as obesity (Lonergan et al., 2024; Shyam et al., 2024), hypertension (Ju et al., 2023; Rantanen et al., 2018), and diabetes mellitus (Holt et al., 2014; Roy & Lloyd, 2012). Previous studies have also reported associations between depression and sociocultural factors, including identification with Tribal traditions and perceived discrimination (Dillard et al., 2012; Whitbeck et al., 2002). During the global COVID-19 pandemic, public health measures were enacted that increased the burden of multiple mental health conditions, including a 27.6% increase in cases of major depressive disorders globally in 2020 (Collaborators, 2021; Daly & Robinson, 2022). Stressors related to the global pandemic, such as COVID-19 infections, a lack of job security, and few resources of reliable information about COVID-19 may have contributed to the increase in depression (Hynes et al., 2022). In addition, studies have shown that sex (Mazza et al., 2022) and persistent symptoms from COVID-19 infections (Yu & McCracken, 2024) have been associated with poor mental health during the pandemic.

Information about the burden of depression in American Indian communities during the COVID-19 pandemic is sparse. A nationally representative cross-sectional survey conducted between 2020 and 2021, including 500 American Indian and Alaska Native (AI/AN) participants, found comparable rates of moderate to severe anxiety-depression symptoms between AI/AN and White participants after adjusting for demographic variables and self-reported physical health (Nápoles et al., 2023). A longitudinal medical record–based study conducted in Southern California, including approximately 2,000 AI/AN children and young adults, found that depression rates increased from 2017 to 2021, and the AI/AN group had among the highest depression rates in each calendar year, except 2020 (Xiang et al., 2024). Other studies have examined mental health status among urban AI/AN populations during the COVID-19 pandemic without specifically focusing on depression (Haskins et al., 2024; Haskins et al., 2023). In addition, AI/ANs residing in rural areas or on reservations were not represented in the cited papers. Due to low data precision,

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some important AI/AN mental health indicators such as depression rates were omitted from the Behavioral Health Equity Report 2021 published by the federal government (Center et al., 2021). The lack of AI/AN-specific COVID-19 data might have masked disparities in COVID-19-related health outcomes among AI/AN populations (Skinner et al., 2022), potentially hindering the implementation of effective prevention and intervention strategies. AI/ANs experienced significant health disparities during the pandemic, with some of the highest COVID-19 infection, hospitalization, and mortality rates in the United States (Hatcher et al., 2020; Musshafen et al., 2022). The Strong Heart Study (SHS) is the longest running (over 35 years) and largest study of cardiovascular diseases in American Indian adults (Lee et al., 1990), with extensive pre-pandemic data collected from participants across 12 Tribal nations, primarily in rural areas and reservations in the Great Plains and southwestern United States. Most surviving SHS participants volunteered in the Collaborative Cohort of Cohorts for COVID-19 Research (C4R), a meta-cohort study of 14 NIH-funded prospective populations studies (Oelsner et al., 2022). C4R performed standardized, prospective ascertainment of COVID-19 and aimed to define risk and resilience factors for COVID-19 illness and its long-term sequelae, as well as to examine the impact of the pandemic on trajectories of health and disease. Accordingly, this study is well positioned to address the research question of whether depression burden changed from before to during the pandemic, as well as to identify associated risk factors. Understanding how the pandemic affected the burden of depressive symptoms among American Indian communities is important for informing the allocation of resources and interventions to those in need. Such knowledge will also help public health preparedness in Indigenous communities for future disease outbreaks.

We aimed to assess the prevalence of depressive symptoms before and during the pandemic among American Indians in the SHS. In addition, we planned to examine the relationship between baseline characteristics and depressive symptoms during the pandemic. Finally, we aimed to assess how the severity of depressive symptoms (measured using The Center for Epidemiological Studies Depression (CES-D) scale) changed during the pandemic and its relationship with baseline characteristics. We hypothesized that the burden and severity of depressive symptoms would increase during the pandemic compared with the pre-pandemic period and that certain risk factors would be associated with this change.

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METHODS

Study Population

The SHS and Strong Heart Family Study (SHFS) consists of participants from Arizona, Oklahoma, and North and South Dakota. The original SHS cohort was recruited and examined during 1989-1991 (Phase I) and was re-examined again in 1993-1995 (Phase II) and 1998-1999 (Phase III) (Lee et al., 1990). Family members of some of the original participants were recruited and examined in 2001-2003 (Phase IV) and again in 2006-2009 (Phase V) (North et al., 2003). A CES-D questionnaire was administered to participants in Phases IV and V and a Quality of Life (QOL) questionnaire with some questions similar to the CES-D questionnaire was administered in Phase III. C4R leverages pre-COVID-19 SHS data collected on clinical and subclinical diseases, along with their risk factors, including biomarkers, lifestyle factors, and socioeconomic determinants of health (Oelsner et al., 2022). A total of 1,144 SHS/SHFS participants completed the C4R Wave 2 Questionnaire (W2Q) between September 2021 and early 2022, which included the CES-D-10 questions. Of these participants, 1,013 completed all CES-D-10 questions in both C4R and SHS/SHFS and were included in this analysis. In this paper, "baseline" will refer to the most recent pre-pandemic SHS/SHFS exam (either Phase III, IV, or V) and "follow-up" will refer to the W2Q. The most recent SHS/SHFS baseline exams for these participants were Phase V (n=761), Phase IV (n=46), and Phase III (n=206). The process of the selection of study population was outlined in Figure 1. This study was approved by the institutional review boards of participating institutions and Tribes. All participants gave informed consent.

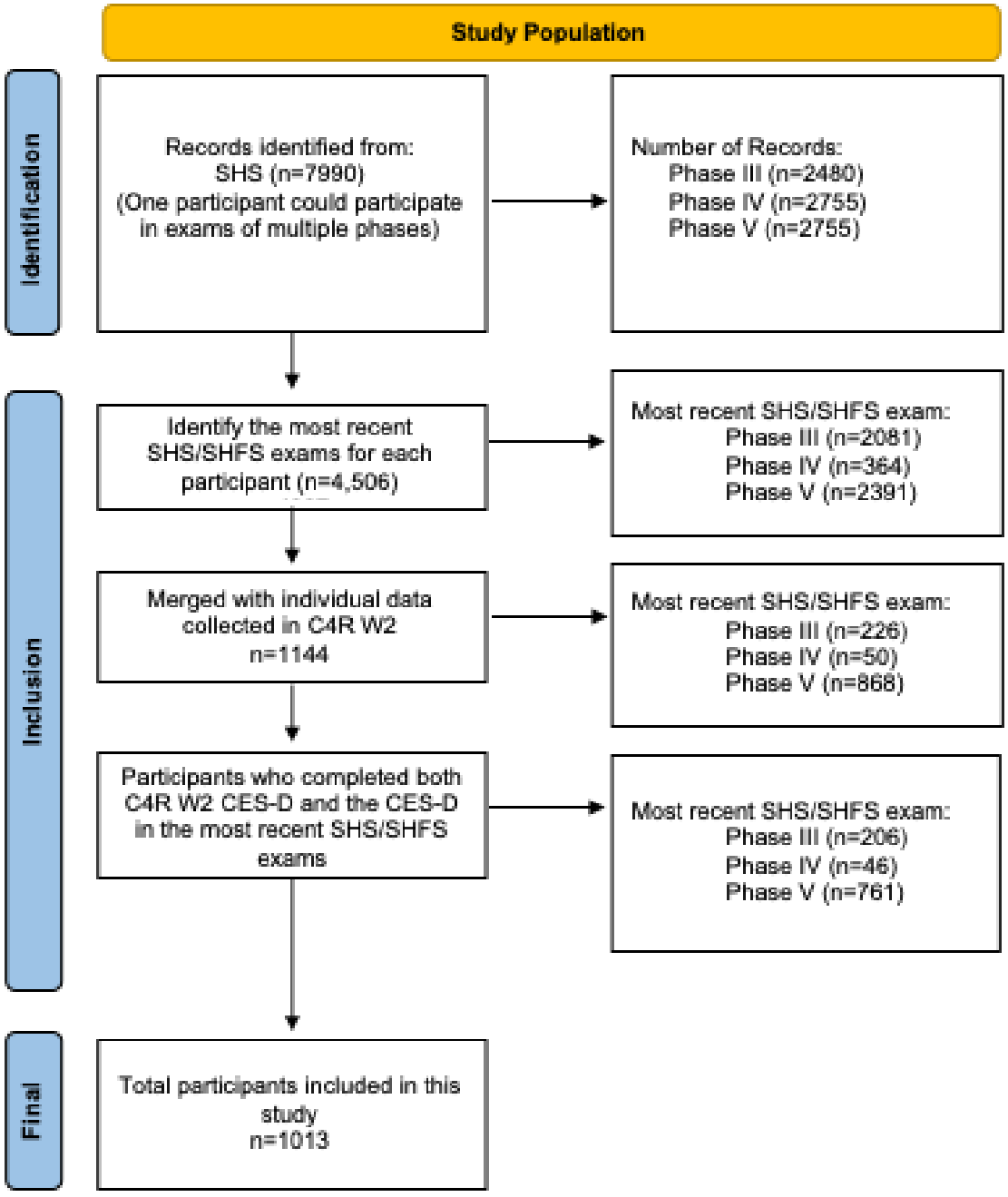
Measures

The primary outcome for this study was depressive symptoms, which were assessed using the CES-D-10 scale. The CES-D scale is a 20-question, self-reported questionnaire, but is often shortened to 10 questions (CES-D-10) to improve data collection in population research projects or for other purposes (Boey, 1999; Zhang W, 2012). While the questionnaire is not a diagnostic tool, several studies have shown that the CES-D-10 scale is reliable and valid in measuring depression (Boey, 1999; Mohebbi et al., 2018; Zhang W, 2012). Each response option for the CES-D questions is assigned a score from 0 ("Rarely or none of the time") to 3 ("All of the time"), with some questions reverse coded. Responses are summed up to obtain a total CES-D score, with higher scores indicating more severe depressive symptoms. CES-D questions were not

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administered in SHS Phase III, so 10 questions from the SHS Quality of Life (QOL) questionnaire were matched to CES-D questions and responses (see Appendices A and B).

Figure 1
Selection of Study Population



Note. SHS=Strong Heart Study; SHFS=Strong Heart Family Study; C4R W2=Collaborative Cohort of Cohorts for COVID-19 Research Wave 2 Questionnaire; CES-D=Center for Epidemiological Studies Depression

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QOL questions (Appendix C) include six response options ranging from "All of the time" to "None of the time." To align with the CES-D scoring, QOL responses were coded as follows: "All of the time" and "Most of the time" were scored as 3; "A good bit of the time" was scored as 2; "Some of the time" was scored as 1; and "A little of the time" and "None of the time" were scored as 0.

Based on literature review (Andresen et al., 1994; Bjorgvinsson et al., 2013), we defined the presence of depressive symptoms as a CES-D-10 score ≥ 10. CES-D-10 score was also analyzed as a continuous variable to study the change in the severity of symptoms. The CES-D questionnaire has been validated for the screening of depressive symptoms in American Indians (Curyto et al., 1998; Somervell et al., 1993)

Conventional risk factors for depressive symptoms were collected at participants' baseline SHS/SHFS exams. Baseline variables considered in this study were age in years, sex (male or female), smoking (yes or no), alcohol use (yes or no), BMI (kg/m2), depressive symptoms identified by CES-D unless otherwise indicated, hypertension, and diabetes. Current smokers are defined as those who have smoked at least 100 cigarettes in their entire life and currently smoke. Alcohol use status is defined as having consumed alcoholic beverages and having had a drink in the last 12 months. Hypertension is defined as those taking an antihypertensive drug; diuretics or beta-blockers or cardiac medications or vasodilators and history of hypertension; systolic blood pressure≥140 mmHg; or diastolic blood pressure≥90 mmHg. Diabetes is defined as taking insulin or a hypoglycemic agent; on renal dialysis or had a kidney transplant and reported a history of diabetes; or fasting glucose ≥ 126 mg/dL.

COVID-19 disease status was derived using the C4R Wave 2 Questionnaire. Participants were first asked whether they had ever been tested for COVID-19. Those who responded yes (n=792) were then asked whether they had ever received a positive test result. Participants who answered yes to both questions were classified as having had COVID-19 (n=334). Additional cases were identified based on self-reported COVID-19 experiences and health care provider diagnosis. Participants who reported that they thought they had COVID-19 and were told by a healthcare provider that they had COVID-19 were classified as cases (n=14). Three participants who reported having had COVID-19 but did not answer the healthcare provider question were also classified as cases. Overall, COVID-19 infection was defined as either a self-reported positive test or a healthcare provider–confirmed diagnosis, with the inclusion of three additional self-reported cases to minimize under-ascertainment. In total, 351 COVID-19 cases were identified.

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Statistical Methods

All analyses were conducted in SAS, version 9.4, and all tests used a significance level of 0.05. Demographic and clinical characteristics of the study population at baseline and follow-up were described by means (standard deviation) for continuous variables or median (the first quartile or Q1, the third quartile or Q3) if their distributions were skewed, and frequencies (percentages) for categorical variables.

Since SHFS participants were recruited within families, they could not be treated as independent observations in data analyses. Generalized estimating equations (GEE) were used to evaluate the associations between the presence of depressive symptoms and potential risk or protective factors, while adjusting for familial relatedness. Each family in the SHFS was treated as a cluster. Participants without family members in the study were counted as their own family. We first examined the univariable associations between the presence of depressive symptoms and age, sex, current smoking, current alcohol use, BMI, baseline CES-D score, hypertension, diabetes, and self-reported COVID-19 infection. Factors significantly related to depressive symptoms in the univariable models were considered for the multivariable model. Backwards selection was used to select the final model. Stepwise selection was also used in the exploratory analyses to ensure we captured all important covariates. All possible combinations of interactions between the remaining covariates in the final model were tested for effect modification.

To study how the severity of depressive symptoms changed during the pandemic, we used a mixed modeling method to examine the change in CES-D scores from baseline to follow-up exams. All covariates were considered for this model with backwards selection being used to select a set of covariates for the final model. Familial relatedness was adjusted in the same manner as described previously in the GEE models. The reported difference in CES-D scores was assessed using the least square means.

RESULTS

We first described the demographic and clinical characteristics at the baseline and follow-up exam. About 69% of participants were female and the average age at baseline was 45.4 years (SD: 14.1) (Table 1). At baseline, participants had a median CES-D score of 4.0 (first and third quartiles: 2.0, 9.0), with 22% of participants displaying depressive symptoms (CES-D≥10).

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Several risk factors like alcohol use (53%), smoking (36%), hypertension (34%), and diabetes (22%) were common among participants.

At follow-up, 24% of participants displayed depressive symptoms and the median CES-D score among all participants was 5.0 (first and third quartiles: 2.0, 9.0) (Table 1). During the C4R-W2Q follow-up data collection in the pandemic, 35% of participants reported having had a COVID-19 infection.

Table 1.
Characteristics of Study Population at Baseline and Follow-Up

	Baseline (SHS)		Follow-Up (C4R)	
Characteristics	**Measure**	**N**	**Measure**	**N**
CES-D Score	4.00 (2.00, 9.00)	1013	5.00 (2.00, 9.00)	1013
Depressive Symptoms (CES-D≥10)	218 (21.52%)		240 (23.69%)	
Age, years	45.39 (14.05)	1013	61.8 (15.8)	1010
Female [a]	699 (69.00%)	1013		
Current Smoking [a]	361 (35.81%)	1008		
Current Alcohol Use [a]	532 (52.83%)	1007		
BMI (kg/m^2) [a]	32.05 (27.73, 37.32)	1006		
Hypertension [a]	347 (34.42%)	1008		
Diabetes [a]	218 (21.73%)	1003		
Self-reported COVID-19 Infection [b]			351 (35.38%)	992

Note. SHS=Strong Heart Study; C4R=Collaborative Cohort of Cohorts for COVID-19 Research; CES-D=Center for Epidemiological Studies Depression Scale; BMI=Body Mass Index
Results for continuous variables are reported as mean (standard deviation) or, if skewed, median (Q1, Q3).
Results for categorical variables are reported as count (%).
[a] Collected at baseline only.
[b] Collected at follow-up only.

Second, we studied univariable associations between baseline characteristics and the presence of depressive symptoms at the follow-up exam during the COVID-19 pandemic. The associations between each baseline covariate and the presence of depressive symptoms at follow-up are displayed in Table 2. A one-year increase in age was associated with a 2% decrease in the odds of depressive symptoms (p value<0.001), while a one-unit (or 1kg/m^2) increase in BMI was associated with a 2% increase in the odds of depressive symptoms (p value = 0.010). Females

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(OR=1.79, 95% CI: 1.25, 2.56), current smokers (OR=1.45, 95% CI: 1.08, 1.96), and current alcohol users (OR=1.30, 95% CI: 0.996, 1.70) had significantly higher odds of having depressive symptoms at follow-up. Having depressive symptoms at baseline was associated with 2.96 (95% CI: 2.19, 4.00) times higher odds of having depressive symptoms at follow-up. Baseline CES-D score and reporting a COVID-19 infection were also associated with increased odds of depressive symptoms at follow-up.

Table 2.
Univariable Associations Between Baseline[a] Covariates and Presence of Depressive Symptoms at Follow-Up

Characteristics	Depressive Symptoms at Follow-Up			
	Present N=240	**None N=773**	**OR (95% CI)**	***p* value [b]**
Age, years	42.51 (13.93)	46.31 (13.97)	0.98 (0.97, 0.99)	**<0.001**
Female	187 (77.92%)	512 (66.24%)	1.79 (1.25, 2.56)	**0.001**
Current Smoking	101 (42.44%)	260 (33.77%)	1.45 (1.08, 1.96)	**0.015**
Current Alcohol Use	138 (57.98%)	394 (51.24%)	1.30 (0.996, 1.70)	0.054
BMI (kg/m^2)	34.48 (8.72)	32.84 (7.58)	1.02 (1.01, 1.04)	**0.010**
Baseline CES-D Score	8.60 (6.41)	5.23 (4.99)	1.10 (1.08, 1.13)	**0.013**
Baseline Depressive Symptoms (CES-D≥10)	90 (37.50%)	128 (16.56%)	2.96 (2.19, 4.00)	**<0.001**
Hypertension	72 (30.25%)	275 (35.71%)	0.78 (0.56, 1.12)	0.181
Diabetes	60 (25.10%)	158 (20.68%)	1.23 (0.90, 1.70)	0.199
Self-reported COVID-19 Infection	105 (44.49%)	246 (32.54%)	1.64 (1.19, 2.26)	**0.003**

Note. OR=Odds Ratio; CI=confidence interval; CES-D= Center for Epidemiological Studies Depression Scale; BMI=Body Mass Index
Results reported as mean (SD) for continuous variables or n (%) for categorical variables. Rates were calculated based on the participants who had complete information for each variable. ORs and *p* values were obtained using generalized estimating equations (GEEs) and were adjusted for familial relatedness.
[a]All covariates were collected at the baseline exams except self-reported COVID-19 infection status, which is only collected in the follow-up C4R exam.
[b]Bold indicates significance (*p* value<0.05).

Next, we conducted multivariable GEE modeling to identify baseline characteristics associated with depressive symptoms during the pandemic, adjusting for other covariates. After model selection, we found that sex, self-reported COVID-19 infection, and baseline CES-D score were significantly associated with depressive symptoms at follow-up (Table 3). In addition, a significant interaction was identified between self-reported COVID-19 infections and baseline

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CES-D score. Therefore, we calculated the stratified odds ratio for the presence of depressive symptoms at the follow-up exam, stratified by baseline depressive symptoms (CES-D ≥ 10 vs. CES-D<10). In this final model, being female was still associated with increased odds of depressive symptoms (OR=1.57, 95% CI: 1.12, 2.21). Among participants who had depressive symptoms at the baseline exams, COVID-19 infection was not significantly related to the follow-up depressive symptoms. However, among participants without depressive symptoms at baseline, COVID-19 infection (vs. no infection) was associated with a 1.76-fold increase in the odds of experiencing depressive symptoms at follow-up.

Finally, to find out how CES-D scores changed during the pandemic, we conducted a longitudinal analysis (Table 4). After adjusting for age, sex, current smoking, BMI, and self-reported COVID-19 infection, we found that average CES-D scores during the pandemic were 0.30 points (95% CI: -0.16, 0.76) higher than before the pandemic, though this change was not statistically significant.

Table 3.
Multivariable Model for Association Between Risk Factors and Presence of Depressive Symptoms

	Depressive Symptoms at Follow-Up	
Parameter	**OR (95% CI)**	***p* value [a]**
Sex (Female vs Male)	1.57 (1.12, 2.21)	**0.009**
Self-Reported COVID-19 (Yes vs. No)		
Baseline Depressive symptoms (CES-D ≥ 10)	1.07 (0.55, 2.07)	0.833
Baseline Depressive symptoms (CES-D < 10)	1.76 (1.21, 2.56)	**0.003**

Note. OR=Odds Ratio; CI=confidence interval; CES-D= Center for Epidemiological Studies Depression Scale; BMI=Body Mass Index
[a] Bold indicates significance (*p* value <0.05).

Table 4.
Difference Between CES-D Score at Baseline and Follow-Up

Comparison	**Estimated Difference (95% CI)**	**Standard Error**	***p* value [a]**
CES-D: Follow-Up vs Baseline [b]	0.30 (-0.16, 0.76)	0.234	0.198

Note. CI=confidence interval; CES-D =Center for Epidemiological Studies Depression Scale.
[a] Bold indicates significance (*p* value<0.05).
[b] Adjusted for age, sex, current smoking, BMI, and self-reported COVID-19 infection.

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DISCUSSION

Among those who did not have depressive symptoms at the baseline exam, self-reported COVID-19 infection is associated with significantly increased odds of having depressive symptoms during the pandemic. To the best of our knowledge, this is a unique finding that has not been previously reported. The next step is to investigate the underlying mechanisms.

While previous studies have indicated that the prevalence of depressive disorders may have increased considerably during the pandemic (Collaborators, 2021), our results showed an insignificant increase of 0.3 points of CES-D score. In the SHS cohort, the prevalence of depressive symptoms and median CES-D scores were similar both before and during the pandemic. The prevalence of depressive symptoms in our study was 22% pre-pandemic and 24% during the pandemic, which is similar to the pre-pandemic rates of depression reported in previous SHS publications (Santoni et al., 2025; Staff et al., 2023). The resilience of American Indians is being studied recently in the SHS and may help us to better understand this trend. The burden of depression varies among Tribal nations across the country (Gone & Trimble, 2012). A study of Alaska Natives 18 years or older reported a 17% depression rate (13% for men and 20% for women) (Dillard et al., 2012). Another study of 3,084 Tribal members 15–54 years from Southwest and Northern Plain found lifetime prevalence of major depressive episodes range from 7.2% to 14.3% among men and women based on the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPF) algorithm (Beals et al., 2005). A report of 861 Tribally enrolled parents and caretakers aged 17-77 years from the Northern Midwest United States and Canada revealed a 17.1% (9.3% for male and 20% for female) lifetime prevalence of major depression (Whitbeck et al., 2006). It is important to report the disease burden in different AI/AN groups to meet the prevention and intervention needs.

Individually, we found that age, sex, baseline smoking status, baseline BMI, baseline CES-D score, and self-reported COVID-19 infection were significantly associated with depressive symptoms during the pandemic. Baseline alcohol use, hypertension, and diabetes status were not found to be significantly associated with depressive symptoms. Our multivariable model showed that sex, self-reported COVID-19 infection, and baseline CES-D score remained statistically significant.

In addition, we found that there was not a significant change in mean CES-D scores during the pandemic compared to pre-pandemic data after adjusting for age, sex, current smoking, BMI,

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and self-reported COVID-19 infection. While the result was unexpected based on reports from other ethnic groups (Ebrahimi et al., 2024; Shyam et al., 2024), one study reported that reservation-area American Indian students experienced decreased anxiety, loneliness, and depression compared to a national sample of students (Swaim et al., 2023). We hypothesize that the insignificant change in mean CES-D scores could be partially explained by the historical struggles that American Indian communities have gone through, possibly making them more resilient. In addition, elders in American Indian communities are highly respected as wisdom keepers and mentors of Tribal culture and traditions (Garrett et al., 2014; Whitewater et al., 2016). They nurtured younger American Indians in "Native Ways" of life, which provides the basis for enduring strength and resilience across generations in overcoming adversity (Garrett et al., 2014). Elders might have played an active role in making important decisions amid the COVID-19 pandemic, thus less likely to develop depressive symptoms. More research is needed to confirm this hypothesis. The covariates associated with longitudinal change in CES-D scores were similar to those that were associated with depressive symptoms during the pandemic.

One strength of our study is that we used data from an established cohort study, so baseline characteristics were measured in a reliable way. Moreover, we had a large sample of 1,013 American Indian participants. However, our study is limited by the loss of information on participants who died prior to W2Q. In addition, misclassification of depressive symptoms is also possible due to the re-coding of SHS Phase III QOL questions. While a CES-D cutoff score of 10 is commonly used (Andresen et al., 1994; Bjorgvinsson et al., 2013), optimal cutoff scores have previously been shown to be study specific (Agustini et al., 2019; Baron et al., 2017; Henry et al., 2018). More research may be needed to determine an optimal cutoff score for SHS/SHFS participants. Our study is also limited to the covariates available in the SHS/SHFS and does not include all potential risk factors for depression. For example, information on perceived discrimination was not collected in the SHS/SHFS, and measures of identification with Tribal traditions were not available at the baseline examination of the current study. It is possible that unmeasured variables may confound the associations presented. Furthermore, because the data were collected from participants in 12 Tribal nations involved in the SHS, the results may not be generalized to other American Indian populations.

Our research allowed us to better understand the relationship between some behavioral and clinical characteristics and the presence of depressive symptoms during the pandemic. While our

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results do not establish causal associations, they provide insights into potential target populations for depression interventions during disastrous events such as the COVID-19 pandemic.

CONCLUSION

Our research examined the prevalence and severity of depressive symptoms before and during the pandemic and identified associated risk factors. We found that being female and having a history of COVID-19 infection were associated with higher odds of depressive symptoms during the pandemic—particularly among individuals who did not report depressive symptoms prior to the pandemic. In multivariable analyses, the severity of depressive symptoms did not significantly change during the pandemic. These results can inform the development of targeted depression prevention strategies in American Indian communities. The findings provide new insights into mental health needs and associated factors during disasters such as a pandemic. The similar burden and severity of depressive symptoms observed before and during the pandemic in SHS communities warrant further research to determine whether community resilience plays a role.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest.

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AUTHOR INFORMATION

Marina Chen, MS, graduated from the Department of Biostatistics and Epidemiology at the University of Oklahoma Health Campus in Oklahoma City, OK.

Heather Willmott, MS, is Research Biostatistician at the Center for American Indian Health Research at the University of Oklahoma Health Campus in Oklahoma City, OK.

Megan Eisele, MS, graduated from the Department of Biostatistics and Epidemiology at the University of Oklahoma Health in Oklahoma City, OK.

Asma A Sharaf, MS, graduated from Columbia University Irving Medical Center in New York, NY.

Elizabeth C. Oelsner, MD, DrPH, is an Associate Professor in the Division of General Medicine, Department of Medicine at the Columbia University Irving Medical Center in New York, NY.

Pallavi Balte, PhD, is an Assistant Professor of Medical Sciences (in Medicine) at Columbia University Irving Medical Center in New York, NY.

Shelley A Cole, PhD, is a Professor and Program Lead in Population Health at the Texas Biomedical Research Institute in San Antonio, TX.

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Jason G Umans, MD, PhD, is the Scientific Director of the MedStar Health Research Institute Arizona Field Center in Phoenix, AZ, and Associate Vice President of Translational Science at Georgetown University in Hyattsville, MD.

Tauqeer Ali, PhD, is a Professor in the Center for American Indian Health Research at the University of Oklahoma Health Campus in Oklahoma City, OK.

Amanda Fretts, PhD, is a member of the Mi'kmaq Eel Ground First Nation and an Associate Professor in the Department of Epidemiology at the University of Washington in Seattle, WA.

Amanda Janitz, PhD, is a member of the Choctaw Nation of Oklahoma and an Associate Professor in the Department of Biostatistics and Epidemiology at the University of Oklahoma Health Campus in Oklahoma City, OK.

Michael Anderson, PhD, is a Professor in the Department of Biostatistics and Epidemiology at the University of Oklahoma Health Campus in Oklahoma City, OK.

Ying Zhang, MD, MS, PhD, is Director of the Center for American Indian Health Research and Presidential Professor in the Department of Biostatistics and Epidemiology, Hudson College of Public Health, University of Oklahoma Health Campus in Oklahoma City, OK.

Correspondence concerning this article should be addressed to: Ying Zhang, Center for American Indian Health Research, the University of Oklahoma Health Campus, CHB 112D, 801 NE 13th Street, Oklahoma City, OK 73104, United States. Email: ying-zhang4@ouhsc.edu

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APPENDIX A

Harmonizing SHS Phase III Quality of Life Questions with CES-D-10 Questions

While SHS Phase III did not have CES-D-10 questions, it did contain similar questions in the Quality of Life form. These responses were matched to the closest CES-D questions and the 0 to 3 coded responses (see Table A1). The SHS Phases IV and V contained 20 CES-D questions and the C4R contained 10 CES-D questions (abstracted from the 20-item CES-D) that had 0 through 3 coded responses, so no re-coding was needed for these questions. Since the C4R exams only contained 10 CES-D questions, we decided to use the CES-D-10 scale.

Table A1.
CES-D-10 Questions and SHS Phase III Quality of Life Questions

CES-D-10 Question	SHS Quality of Life Question
I was bothered by things that don't usually bother me	Have you felt so down in the dumps that nothing could cheer you up?
I had trouble keeping my mind on what I was doing	Didn't do work or activities carefully due to emotional problems
I felt depressed	Did you feel downhearted and blue?
I felt that everything I did was an effort	Did you feel tired?
I felt hopeful about the future	Did you feel full of pep?
I felt fearful	Have you been a very nervous person?
My sleep was restless	Have you been a very nervous person?
I was happy	Have you been a happy person?
I felt lonely	Physical health or emotional problem interfered with your social activities
I felt like I couldn't do what I needed to do	Did you feel worn out?

Note. CES-D-10=Center for Epidemiological Studies Depression 10 Scale; SHS=Strong Heart Study

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APPENDIX B

Center for Epidemiological Studies Depression 10 (CES-D-10) Scale

Here is a list of some ways you might have felt or behaved in the PAST WEEK. Please indicate how many days you have felt this way during the past week.

CES-D 10 items	Rarely or none of the time (<1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	All of the time (5-7 days)
I was bothered by things that usually don't bother me				
I had trouble keeping my mind on what I was doing.				
I felt depressed.				
I felt that everything I did was an effort.				
I felt hopeful about the future.[a]				
I felt fearful.				
My sleep was restless.				
I was happy.[a]				
I felt lonely.				
I could not "get going."				

Note. CES-D-10=Center for Epidemiological Studies Depression 10 Scale
[a] This question is reverse coded.

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APPENDIX C

Quality of Life Questions Used in This Study

S-10

These questions are about how you feel and how things have been with you during the PAST 4 WEEKS. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the PAST 4 WEEKS....

(Please Check One Answer Per Line)

		All of the Time	Most of the Time	a Good Bit of the Time	Some of the Time	a Little of the Time	None of the Time
23.	Did you feel full of pep?..QUA3_23	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
24.	Have you been a very nervous person?.....QUA3_24	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
25.	Have you felt so down in the dumps that nothing could cheer you up?..... QUA3_25	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
26.	Have you felt calm and peaceful?QUA3_26	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
27.	Did you have a lot of energy?.QUA3_27	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
28.	Did you feel downhearted and blue?.....QUA3_28	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
29.	Did you feel worn out?.....QUA3_29	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
30.	Have you been a happy person?QUA3_30	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6
31.	Did you feel tired?.....QUA3_31	|___|1	|___|2	|___|3	|___|4	|___|5	|___|6

32. **During the PAST 4 WEEKS, how much of the time has your PHYSICAL HEALTH or EMOTIONAL PROBLEMS interfered with your social activities (like visiting with friends, relatives, etc.)?**

(Please Check One Answer) QUA3_32

All the time..... |___|1
Most of the time..... |___|2
Some of the time..... |___|3
a Little of the time..... |___|4
None of the time..... |___|5

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Reporting Historical Loss Events and Mental Health in American Indians

Kyla R. Molina (Chickasaw Nation), PsyD, Yi Shao, PhD, and Lori Holmquist-Day, PhD

Abstract: *The concept of historical trauma highlights how past events shape contemporary well-being through various pathways, including conscious awareness of historical losses. While previous research has established connections between thinking about historical losses and mental health outcomes, existing assessments primarily rely on retrospective self-reports regarding the frequency of such thoughts to derive historical loss scores. This study explored how American Indian participants (N = 104) reported negative past events experienced by American Indians during an online timed task. We examined the antecedents and consequences of such reporting and found that most of the negative collective past events reported were historical loss events, with a small portion related to residential school experiences. Self-reported historical loss scores, rather than enculturation or ethnic identity centrality, predicted the likelihood of reporting historical loss events. Women and individuals with family residential school experiences were more likely to report historical loss events. Furthermore, the reporting of historical loss events moderated the relationship between historical loss scores and anxiety symptoms. Specifically, the association between historical loss scores and anxiety symptoms was observed only among those who reported a higher number or proportion of historical loss events.*

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INTRODUCTION

In October 2024, President Biden issued a formal apology for the federal government's role in managing residential schools, acknowledging the extensive harm inflicted on Indigenous communities. This apology marked the first presidential acknowledgment of these historical injustices and emphasized the need for continued efforts to support healing and education about this dark chapter in American history. Historical losses, particularly those associated with residential school experiences, continue to affect American Indian communities across generations (Whitbeck et al., 2004). While research has established links between thinking about historical losses and mental health outcomes (Gone et al., 2019; Gone & Trimble, 2012), existing assessments primarily rely on retrospective self-reports about the frequency of these thoughts. This study examined individuals' spontaneous reporting of historical loss events using a timed, open-ended task in which participants were asked to freely report negative events experienced by American Indians, contrasting with existing measures that rely on predefined lists of losses. We also explored the individual differences associated with such reporting and their relationships with mental health outcomes.

Research on historical trauma has been ongoing for several decades, particularly in relation to Indigenous populations in North America (Brave Heart et al., 2011; Brave Heart & DeBruyn, 1998; Gone et al., 2019). Indigenous historical trauma encapsulates the lingering effects of cultural suppression, genocide, and colonization of American Indians, including forced removal from ancestral lands, language eradication, and cultural loss through residential schools (Cromer et al., 2018). Historical trauma represents the collective psychological injuries resulting from past collective traumatic experiences shared by a group (Mohatt et al., 2014). Similar to other forms of trauma experienced directly by individuals, historical trauma can manifest through recurrent thoughts about these events and their subsequent losses. This phenomenon, known as historical loss thinking, involves the allocation of cognitive resources to reflect on the consequences and impact of the loss of land, language, beliefs, and culture (Whitbeck et al., 2004). The nature and frequency of these thoughts are often measured using self-report questionnaires such as the Historical Loss Scale (HLS). Historical loss thinking has been suggested to share similarities with

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other negative thinking patterns commonly associated with psychopathology, such as rumination and negative attribution styles (Tucker et al., 2016).

Individual differences exist in how people think about historical loss. One factor related to these differences is ethnic identity, which encompasses both cultural engagement and identity centrality (Phinney, 1996). Cultural engagement reflects how frequently individuals participate in ethnic cultural activities, while identity centrality represents how central one's ethnic group identity is to one's broader personal identity. Research has shown that both higher levels of cultural engagement and stronger ethnic identity centrality are associated with reporting more frequent thoughts about historical losses (Cromer et al., 2018; Soto et al., 2015; Tucker et al., 2016; Walls et al., 2016).

Historical trauma has been linked to elevated rates of mental illness, including depression and anxiety, among American Indians, regardless of whether they reside on reservations (Gone et al., 2019; Gone & Trimble, 2012). Research involving Indigenous populations in Canada has consistently demonstrated that a family history of residential school experiences is associated with adverse mental health outcomes (Gray & Cote, 2019; Hahmann et al., 2023; Matheson et al., 2020). Individuals with a family history of residential school attendance report worse mental health outcomes than those without such a history. However, not everyone is affected in the same way, highlighting the need to explore the potential pathways through which historical loss thinking contributes to mental health challenges.

Gone et al. (2019) noted that current historical loss assessments depend on individuals' retrospective self-reports about how often they think about historical losses. These measures assume that historical loss scores accurately reflect people's thoughts about historical loss events. Despite calls for research that captures such responses in real time, rather than retrospectively, no study, to our knowledge, has directly tested whether historical loss scores correspond to the actual prominence of historical loss in individuals' broader cognitive representations of American Indian experiences. Furthermore, it is important to view trauma as narrative representations (Mohatt et al., 2014), where narrative salience is crucial. This perspective suggests that how individuals express historical loss events may provide deeper insight into their impact than frequency-based self-reports alone. While previous research has explored historical trauma through direct in-depth interviews with service providers (Hartmann & Gone, 2014, 2016), focus group discussion with urban American Indians (Guenzel & Struwe, 2020) and First Nation peoples (Weiss et al., 2023), and interviews and focus groups with American Indian elders (Grayshield et al., 2015), it remains

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unclear whether historical loss naturally emerges in broader American Indian communities when trauma is not explicitly discussed.

Current Study

Together, these gaps highlight the need for a methodological approach that moves beyond self-report measures and explicit trauma discussions to capture how historical loss manifests organically within American Indian communities. If historical loss is truly salient, it should emerge unprompted when individuals are given the opportunity to freely express their thoughts and experiences. A fluency task offers a naturalistic, real-time window into cognitive salience, enabling researchers to assess whether historical loss themes surface spontaneously rather than as explicitly prompted reflection of perceived recollection frequency. Indeed, fluency tasks have been used in psychological research to examine collective memory across cultures (Abel et al., 2019). This study addressed these gaps by using a fluency task, including reporting negative collective past events, to examine the unprompted salience of historical loss. We conducted a content analysis to categorize participants' responses to historical loss versus non-historical loss.

Additionally, we aimed to explore factors influencing the reporting of historical loss events. In a well-regarded review of Indigenous historical trauma research, authors raised concerns that Indigenous cultural identity might lead to the adoption of "a narrow and overgeneralized form of historical consciousness" (Kirmayer et al., 2014, p. 307), suggesting a potential association between ethnic identity and the reporting of historical loss. Therefore, strength of ethnic identity was assessed by cultural engagement and ethnic identity centrality as potential factors in the current study.

Our research had two primary objectives: 1) to examine individual differences in the spontaneous reporting of historical loss during an open-ended fluency task centered on negative collective past events, and 2) to explore the relationship between participants' Historical Loss Scale scores, their reporting of historical loss events, and mental health outcomes, considering both positive and distinct negative aspects of mental health (i.e., depression and anxiety). Specifically, we proposed two potential mechanisms to explain these relationships. The first mechanism proposed that the spontaneous reporting of historical loss events may mediate the relationship between historical loss scores and mental health outcomes. In this framework, the frequency of perceived loss influences mental health through participants' tendency to spontaneously report historical loss as negative events in American Indian history. The second mechanism proposed that the spontaneous reporting of historical trauma might moderate the relationship between

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historical loss and mental health outcomes. In this case, the frequency of perceived loss might not directly predict mental health outcomes. Rather, we hypothesized that the relationship between historical loss and mental health outcomes would be stronger among individuals who spontaneously reported more historical loss events.

METHODS

Participants

Participants were American Indian adults (at least 18 years old) currently enrolled in a federally or state-recognized tribe. Initial recruitment was carried out through the first author's personal connections, Facebook, and the Society of Indian Psychologists listserv (n = 34), with subsequent recruitment via Prolific (n = 75), an online crowdsourcing platform widely used in psychology research for online participant recruitment. The target sample size of 92 participants was determined based on power calculations for a separate analysis focused on mental time travel (Shao et al., 2026), which examined a 2×2×2 design crossing direction of mental time travel (past vs. future), valence (positive vs. negative), and domain (personal vs. collective). The current study was nested within that broader project, focusing specifically on negative collective past recollections as a subset of the mental time travel tasks (see below). Prior to data collection, the study was preregistered on the Open Science Framework (OSF; https://osf.io/ht2mu/), specifying the hypotheses, target sample size and stopping rule, inclusion and exclusion criteria, and the analysis plan. The project was approved by the IRB of the institute (HD042123).

Procedure

Participants completed the study on Qualtrics, an online survey platform commonly used in psychological research. Participants were recruited to participate in a study on mental time travel, with tribal enrollment status specified as an eligibility requirement. Participants were informed that the study would involve reporting past life events and possible future events and responding to questions related to their mental health. Participants were reminded that their involvement was voluntary, that they could withdraw from the study at any time, and that all responses would remain anonymous and confidential. After consenting to participate, participants first completed the mental time travel fluency tasks (described in detail in the Measures section). The order of the different task types was randomized via Qualtrics.

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Next, they completed the two mental health measures (depression and anxiety; life satisfaction), with the order counterbalanced across participants. They then completed assessments of enculturation, historical loss, and demographic information, which included the question on ethnic identity centrality. Feedback was collected from participants prior to the debriefing screen using the question "Any feedback, comments?". The debriefing screen informed participants of the purpose of the research, provided researcher contact information, and directed participants to online mental health resources. On average, participants took approximately 20 minutes to complete the survey measures.

Measures

Demographics

The questionnaire included questions about age, gender identity, education level, tribal affiliation, residential school experience for themselves and their direct ancestors, and state of residence.

Mental Time Travel Fluency Task

In the mental time travel fluency task, participants reported events from their personal past, collective past ("Please list as many positive/negative things that happened to Native Americans and Indigenous populations as possible."), personal future, and collective future, with the order of prompts randomized across participants. The instructions were modeled after previous studies on personal and collective mental time travel (Shrikanth & Szpunar, 2021; Shrikanth et al., 2018). Participants were informed that they had 1 minute to complete each prompt. Each of the eight prompts was displayed on the screen for 1 minute before moving on to the next prompt. Participants were instructed to provide their responses in separate text boxes, one per event. Each prompt was defined by a specific combination of three dimensions — domain (self vs. Indigenous populations), time frame (past vs. future), and valence (negative vs. positive)—which were presented to participants in bold and underlined text. Following each prompt, participants completed an instruction check requiring them to identify which dimension they had been asked to report on. They were randomly presented with one of three instruction check questions, with answer options of "Myself/Indigenous populations," "Past/Future," or "Negative/Positive." Failure to correctly identify the targeted dimension would suggest the participants had not fully processed the prompt's instructions, rendering their responses unreliable. One participant who failed the instruction check

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was excluded from data collection, as their responses could not be assumed to reflect the intended prompt conditions, which would compromise the validity of the data.

Historical Loss Scale

The Historical Loss Scale was developed and validated with Indigenous adults (Whitbeck et al., 2004). The scale consists of 12 items that measure perceived losses (e.g., loss of land, loss of culture, and loss of language) and the frequency of thoughts associated with historical loss. Participants answer a series of questions addressing cultural loss, loss of people, and cultural mistreatment with responses ranging from "several times a day" (1) to "never" (6). The Cronbach α coefficient for this study was .93. A reversed average raw score is yielded and serves as the indicator of the level of historical loss thinking. Higher scores indicate more frequent thoughts about historical losses.

Enculturation

The American Indian Enculturation Scale (AIES; Winderowd et al., 2008) is a measure of enculturation designed for use with American Indian populations. The AIES contains 17 items that measure the frequency with which American Indians participate in their culture, such as attending Indigenous churches, ceremonies, and powwows, with responses ranging from "not at all" (1) to "a great deal" (7). In the current study, the word "Indian" in the original scale was changed to "Indigenous" for clarity and term preference. Cronbach α coefficient for this study was .94. Responses were averaged, with higher scores indicating greater enculturation.

Ethnic Identity Centrality

Participants rated one statement ("Being Native American is important to my personal identity") on a 5-point scale from "strongly disagree (1)" to "strongly agree (5)." Sahdra and Ross (2007) used a single statement to measure the strength of ingroup identification. The current statement was adapted from their centrality measurement example, originally designed to assess the importance of group membership to self-identity in the context of Canadian identity, to reflect American Indian identity.

Depression and Anxiety

The Depression Anxiety Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995) is a 21-item set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. Participants were asked to complete only the depression (e.g., "I couldn't seem

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to experience any positive feeling at all") and anxiety (e.g., "I was worried about situations in which I might panic and make a fool of myself") subscales, which consist of 7 questions each on 4-point scales (0–3). Higher average scores indicate higher levels of anxiety (α = .85) and depression (α = .91), respectively.

Life Satisfaction

The Satisfaction With Life Scale (SWLS, Diener et.al, 1985) is a self-report measure of satisfaction with life. It consists of five questions (e.g., "I am satisfied with life.") on 7-point scales, α = .90. The average score represents overall life satisfaction with higher scores indicating greater life satisfaction.

Analysis

The study focused only on negative collective past events among the eight event types reported in the mental time travel fluency task. We first identified participants' mentions of events associated with historical loss. Then, we categorized historical loss events into two categories: residential school experiences and other historical losses. The coding scheme was primarily based on the Historical Loss Scale (Whitbeck et al., 2004). Responses that aligned with items from the Historical Loss Scale were coded as historical losses (e.g., "Taking of land"), while mentions of residential school were specifically coded as residential school-related historical losses ("e.g., "Trauma of boarding schools"). Responses that did not reflect historical losses were coded accordingly (e.g., "Discrimination").

The first author, an American Indian, elaborated on the coding scheme by providing examples. Two non-American Indian coders, who were trained on the coding scheme, independently coded 20% of the responses. The coders were provided only the responses for negative collective past events and were blind to the hypotheses of the study. The intercoder reliability was κ = .96. One coder then coded the remaining responses.

We counted both the total number of historical loss events reported and the subset related to residential school experiences. We also calculated the proportion of historical loss events and residential historical loss events relative to all negative collective past events. Analyses were conducted using IBM SPSS Statistics (Version 31).

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RESULTS

Following the preregistration, data from participants who completed the mental time travel fluency task were included in data analysis (N = 109). Among them, 104 (65 women, 32 men, 7 did not identify within the gender binary; age range: 20–78 years, M = 38.93, SD = 12.89) completed all measures, including demographic information. The participants had diverse educational backgrounds, including high school graduates (n = 12), some college education (n = 32), college degree holders (n = 28), and individuals with graduate or professional degrees (n = 32). Participants were from 32 states.

Descriptive Statistics and Preliminary Analyses

Table 1 presents descriptive statistics for all study variables, including negative collective past events, historical loss events, and residential historical loss events. On average, 65% (SD = 0.25) of the negative collective past events were categorized as historical loss events, while 8% (SD = 0.14) were further categorized as residential school historical loss events; the remaining negative collective past events were non-historical loss events. Participants' mean scores on the Historical Loss Scale indicated they experienced thoughts about historical losses approximately once per month (Table 1). When norms were unavailable, scores were compared to the midpoint of their respective scale. Participants reported high levels of enculturation, t (104) = 5.16, p < .001, d = 0.50, and high ethnic identity centrality, t (104) = 15.57, p < .001, d = 1.53. Based on norms provided by the original scale developers, participants reported average life satisfaction (Diener et.al, 1985) and mild levels of depression and anxiety (Lovibond & Lovibond, 1995).

Gender differences across all outcome variables were examined (Table 2). Significant differences were observed only in the reporting of historical loss events, with women being more likely than men to report historical loss events, including residential school historical loss events (both in counts and proportions).

The association between education levels and all outcome variables were also examined. Higher levels of education were associated with greater engagement in cultural events, r (102) = .23, p = .02, higher levels of life satisfaction, r (102) = .35, p < .001, and lower levels of depression, r (102) = -.37, p < .001, and anxiety, r (102) = -.27, p = .006. All other variables failed to reach statistical significance in their association with education level. Age was not significantly associated with historical loss event reporting.

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Correlational Analyses

We first present the correlations for the primary variables of interest: historical loss events and residential school historical loss events. Subsequently, we will report on the correlations with other variables.

The number and proportion of historical loss events among negative collective past events were not statistically correlated with the strength of ethnic identity, whether measured by enculturation or ethnic identity centrality (Table 1). The number of historical loss events reported was positively associated with higher Historical Loss Scale scores, r (103) = .23, p = .02. However, it was not correlated with any of the mental health outcome variables, rs < .13, ps > .10.

The proportion of historical loss reported for negative collective past events was negatively associated with life satisfaction, r (106) = - .22, p = .02, but not with other outcome variables, rs < .16, ps > .11. This means that participants who reported a greater proportion of historical loss from negative collective past events tended to have lower life satisfaction.

The number and proportion of residential school historical loss events among negative collective past events showed no significant correlations with any outcome variables, rs < .10, ps > .32. Given both its low frequency and lack of correlation with outcome variables, we did not conduct additional analyses examining the role of reporting residential school historical loss events.

Historical Loss Scale scores showed positive associations with both ethnic identity indicators, enculturation and ethnic identity centrality (Table 1). That is, Historical Loss Scale scores were higher among individuals with stronger ethnic identity, specifically, those with greater enculturation and ethnic identity centrality. Interestingly, higher Historical Loss Scale scores were associated with greater anxiety but showed no significant association with depression or life satisfaction. Additionally, enculturation exhibited a positive association with anxiety. The higher participants scored on enculturation, the higher their anxiety scores.

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Table 1.
Descriptive Statistics and Correlations for Study Variables

Variables	*M*	*SD*	Min	Max	1	2	3	4	5	6	7	8	9
1. Negative collective past events (0–10)	5.67	2.47	1	10	–								
2. Historical loss events (0–10)	3.75	2.19	0	9	.76***	–							
3. Residential school historical loss (0–10)	0.41	0.57	0	2	.36***	.27**	–						
4. Historical loss scores (1–6)	3.18	0.99	1.08	5.92	.16	.23*	.05	–					
5. Enculturation (1–7)	3.32	1.35	1.06	6.94	- .12	.14	.06	.65***	–				
6. Ethnic identity centrality (1–5)	4.40	0.92	1	5	- .06	.03	-.04	.19*	.29**	–			
7. Life satisfaction (1–7)	4.33	1.50	1	7	- .06	-.14	-.07	.001	.11	- .08	–		
8. Depression (0–3)	0.94	0.87	0	3	.03	.08	.001	.13	- .02	.10	- .66 ***	–	
9. Anxiety (0–3)	0.67	0.65	0	2.86	.14	.10	.09	.34***	.20*	.07	- .37 ***	.63***	–

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2.
Outcome Variables by Gender

Variables	Women (*n* = 65)		Men (*n* = 32)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Historical Loss Scale scores	3.29	1.02	2.88	0.84	1.97	.05	0.43
Negative collective past events	6.06	2.53	5.16	2.42	1.68	.10	0.36
Historical loss events	**4.29**	**2.24**	**2.94**	**1.95**	**2.92**	**.004**	**0.63**
Proportion of historical loss events	.69	.21	.59	.30	1.74	.09	0.43
Residential school historical loss events	**0.54**	**0.56**	**0.19**	**0.47**	**3.23**	**.002**	**0.66**
Proportion of residential school historical loss events	**.10**	**.15**	**.04**	**.09**	**2.24**	**.03**	**0.48**
Enculturation	3.50	1.41	3.02	1.24	1.66	.10	0.36
Ethnic identity centrality	4.49	0.92	4.25	0.95	1.21	.23	0.26
Life satisfaction	4.21	1.35	4.75	1.71	1.71	.09	0.37
Depression	0.94	0.83	0.78	0.89	0.87	.39	0.19
Anxiety	0.69	0.65	0.52	0.56	1.23	.22	0.27

Note. Proportions are calculated based on negative collective past events.

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Role of Reporting Historical Loss Events

The results did not support the proposed mediation model, as we found no significant associations between historical loss events reporting and mental health outcomes. Consequently, we did not pursue additional mediation analyses.

We then tested whether spontaneous reporting of historical loss events moderate the relationship between Historical Loss Scale scores and mental health outcomes. The moderation models for life satisfaction and depression were not statistically significant (Table 3). The moderation model for anxiety was statistically significant, with either the number or the proportion of historical loss events serving as the moderator. While Historical Loss Scale scores themselves did not significantly predict anxiety, both the counts and proportion of reporting historical loss events did (Table 4). Supporting the proposed model of moderation, reporting historical loss events moderated the relationship between Historical Loss Scale scores and anxiety. The effects of historical loss scores were not significant at low levels of reporting historical loss events but became significant at high levels of reporting historical loss events (Figures 1 and 2). That is, among participants who reported few historical loss events, Historical Loss Scale scores showed no significant association with anxiety. However, among participants who reported a greater number of historical loss events, higher Historical Loss Scale scores were associated with significantly greater levels of anxiety. The moderation effect accounted for 5% of the variance in anxiety symptoms for both historical loss events reporting counts, F (1, 101) = 6.57, p = .02, and proportions, F (1, 101) = 6.58, p = .01.

Family Residential School Experience

The analyses in this section were exploratory and not preregistered. Ninety participants (83%) provided a definite answer to the question about family residential school experiences, with 36 (33%) indicating no family experience and 54 (50%) indicating they had such an experience. The remaining 18 (17%) selected “do not know.” Compared to participants without family residential school experience, those reporting such experience had significantly higher Historical Loss Scale scores, a greater number and proportion of reporting historical loss events (including residential historical loss events), higher levels of enculturation (though not ethnic centrality), and worse mental health outcomes across all three indicators (Table 5).

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We performed exploratory analyses to examine potential interaction between gender and family residential school experiences across all outcome variables among those who responded to the family residential school experience question. The only significant interaction effect found was on Historical Loss Scale scores, F (1, 79) = 5.71, p = .02, η_p^2 = .07, alongside a significant main effect of family residential experience, F (1, 79) = 4.09, p = .05, η_p^2 = .05. The elevated Historical Loss Scale scores for those with family residential experience were specific to women, M_D = 1.00, p < .001, 95% *CI* [0.47, 1.53], whereas men showed no significant difference, M_D = 0.08, p = .82, 95% *CI* [-0.82, 0.65].

Table 3.
Moderation Analyses for the Relationship Between Historical Loss and Outcome Variables

Variables	*F*	R^2	*p*
Life Satisfaction			
Historical loss events	0.94	.03	.43
Proportion of historical loss events	2.37	.07	.08
Depression			
Historical loss events	0.74	.02	.53
Proportion of historical loss events	1.39	.04	.25
Anxiety			
Historical loss events	**6.74**	**.17**	**< .001**
Proportion of historical loss events	**6.85**	**.34**	**< .001**

Note. *df*: (3, 101)

Table 4
Moderation Analyses for the Relationship Between Historical Loss and Anxiety

Variables	*B*	*SE*	*t*	*p*	95% *CI*
Historical Loss Events					
Historical Loss Scale scores	0.01	0.10	0.09	.93	[-0.19, 0.21]
Historical loss events	**- 0.20**	**0.08**	**-2.45**	**.02**	**[-0.37, -0.04]**
Historical Loss Scale scores × Historical loss events	**0.06**	**0.02**	**2.56**	**.01**	**[0.01, 0.10]**
Proportion of Historical Loss Events					
Historical Loss Scale scores	-0.10	0.14	-0.76	.44	[-0.38, 0.17]
Historical loss events	**-1.76**	**0.68**	**-2.59**	**.01**	**[-3.11, -0.41]**
Historical Loss Scale scores × Historical loss events	**0.51**	**0.20**	**2.57**	**.01**	**[0.12, 0.91]**

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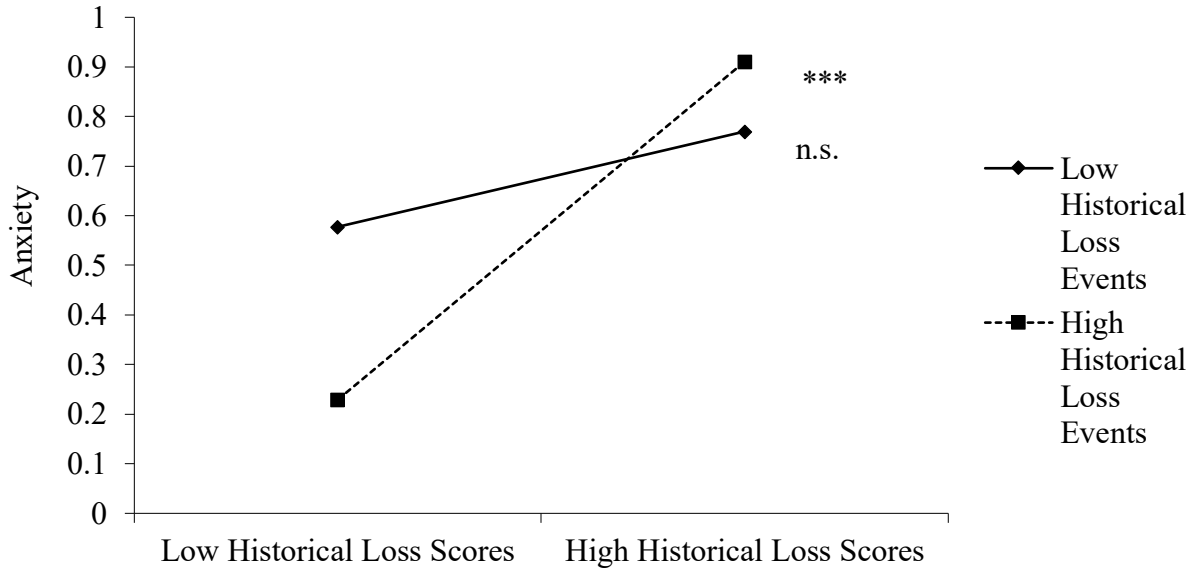
Table 5
Outcome Variables by Family Residential School Experience

Variables	With family residential school experience (*n* = 54)		Without family residential school experience (*n* = 36)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Historical Loss Scale scores	**3.51**	**1.00**	**2.92**	**0.85**	**2.95**	**.004**	**0.63**
Negative collective past events	6.20	2.59	5.47	2.46	1.34	.18	0.29
Historical loss events	**4.33**	**2.23**	**3.33**	**2.19**	**2.10**	**.04**	**0.45**
Proportion of historical loss events	.69	.22	.61	.27	1.45	.15	0.31
Residential historical loss events	**0.57**	**0.60**	**0.19**	**0.40**	**3.59**	**< .001**	**0.72**
Proportion of residential historical loss events	**.11**	**.16**	**.03**	**.08**	**2.96**	**.004**	**0.56**
Enculturation	**3.91**	**1.37**	**2.82**	**1.06**	**4.00**	**< .001**	**0.86**
Ethnic identity centrality	4.59	0.74	4.33	0.96	1.45	.15	0.31
Life satisfaction	**3.78**	**1.38**	**4.98**	**1.50**	**3.89**	**< .001**	**0.84**
Depression	**1.20**	**0.80**	**0.59**	**0.81**	**3.51**	**< .001**	**0.76**
Anxiety	**0.86**	**0.68**	**0.50**	**0.56**	**2.52**	**.01**	**0.54**

Note. Proportions are calculated based on negative collective past events.

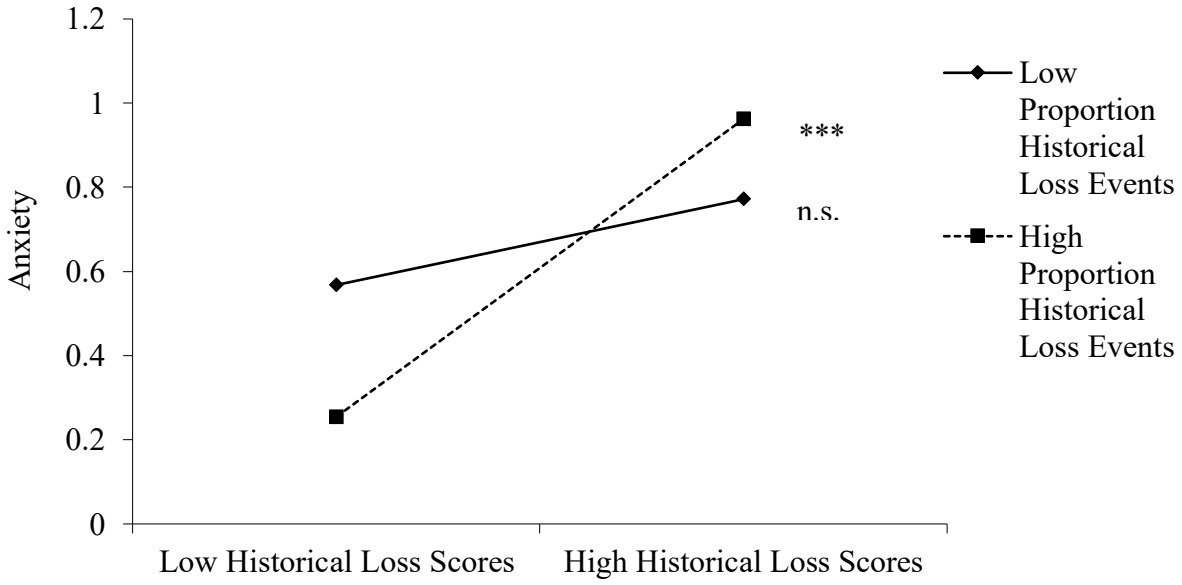
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Figure 1.
Moderation Effect of Reporting Historical Loss Events on the Relationship Between Historical Loss Scores and Anxiety



Note. n.s. demotes slope that is not significant. *** denotes slope that is significant at $p < .001$.

Figure 2
Moderation Effect of Proportion of Reporting Historical Loss Events on the Relationship Between Historical Loss Scores and Anxiety



Note. n.s. demotes slope that is not significant. *** denotes slope that is significant at $p < .001$.

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DISCUSSION

The present study used a fluency task in which a non-clinical sample of American Indian participants reported negative collective past events. We then conducted a qualitative study of their reporting of historical loss events, including a subset of residential school-related historical loss events. We examined individual differences in the nature and extent of historical loss event reporting (e.g., the number of events related to family residential school experiences versus those that were not). We explored how this reporting influenced the relationship between Historical Loss Scale scores and mental health. Our findings suggest that gender and family residential school experience play an important role in individuals' likelihood of reporting historical loss events, particularly those related to residential schools. We found no evidence supporting historical loss event reporting as a mediator between Historical Loss Scale scores and mental health. Our results indicated that such reporting served as a moderator in this relationship. Specifically, Historical Loss Scale scores predicted anxiety only among individuals who reported a high number or proportion of historical loss events.

Factors Influencing the Reporting of Historical Loss Events

The main contribution of this research lies in examining individual differences in the reporting of historical loss events when recounting negative collective past events among American Indians. While historical loss scores predicted the reporting of historical loss events, ethnic identity indicators, despite their correlation with historical loss scores, did not. This suggests that the frequency of thinking about historical losses, rather than strength of ethnic identity, drives spontaneous reporting of historical loss events. Consistent with previous research (Soto et al., 2015; Tucker et al., 2016; Walls et al., 2016), stronger American Indian identity centrality and cultural engagement predict how often individuals think about historical losses; however, these factors do not directly translate into reporting historical loss events. The lack of association between ethnic identity and reporting negative collective past events replicates previous findings at the religious group level, where stronger group identity did not necessarily predict the spontaneous recall of collective victimization events (Sahdra & Ross, 2007). This study provides empirical evidence addressing the concern that cultural identity can foster a narrow and overgeneralized historical consciousness (Kirmayer et al., 2014). Overall, these findings indicate

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that self-reported cognitive engagement with historical losses operates somewhat differently from individuals' communication about historical trauma.

In our study, family residential school experiences influenced participants' outcomes, including varying levels of historical loss scores, reporting historical loss events (particularly those related to residential school experiences), and all mental health outcome indicators. Gender emerged as another significant predictor of reporting historical loss events, though no gender differences were observed in ethnic identity indicators or mental health outcomes. Women traditionally serve as cultural knowledge keepers in many Indigenous communities, playing vital roles in preserving and transmitting historical narratives across generations (Miller, 2020). Beyond American Indian contexts, research has documented consistent gender differences in emotional processing and expression (Chaplin, 2015; Kring & Gordon, 1998). These cultural roles and emotional processing tendencies may contribute to women's increased likelihood of sharing historical loss events in both family and research contexts.

Theoretical and Clinical Implications

Our method allows us to capture the immediacy and salience of historical loss events in participants' minds, offering a novel way to explore how historical trauma is cognitively represented and expressed in the moment. Our research contributes to the discussion on the construct of Indigenous historical trauma. Gone et al. (2019) argued that this construct may function as a metaphoric term, which is challenging to differentiate between being an antecedent to mental health issues or as a result of mental health issues due to the meaning-making process. In this study, participants were recruited for a mental time travel study and completed an open-ended fluency task. Their responses were coded based on items from the Historical Loss Scale. Critically, this fluency task was administered at the start of the study, long before participants were introduced to the Historical Loss Scale, minimizing the likelihood that their responses were shaped by prior exposure to the scale's content. We believe that the historical loss events reported during this task, when prompted to report negative collective past experiences, carry genuine psychological implications for these participants.

We found that about two-thirds of the reported negative collective past events were related to historical loss. While this figure is substantial, it is not so high as to indicate homogeneity or a lack of diversity in the data. The observed relationship between historical loss scores and reporting historical loss events provides evidence supporting the validity of the Historical Loss Scale as a

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measurement tool, even though it relies on retrospective self-reporting. Our moderation findings indicate that the relationship between historical trauma and mental health is not a simple cause-and-effect dichotomy. The moderation effect of reporting historical loss events suggests that historical trauma operates through cognitive awareness rather than being merely an antecedent or a result of mental health issues.

Additionally, our findings on reported family residential school experiences provide evidence for the intergenerational nature of historical trauma. In the context of historical loss specifically, most studies on the impact of family residential school history have focused on Indigenous populations in Canada (Bombay et al., 2014). The only study we are aware of in the United States, however, did not find that family history contributed uniquely to historical loss scores beyond the effects of cultural engagement (Cromer et al., 2018); notably, this study involved participants who had an American Indian grandparent but did not necessarily self-identify as American Indian. Our study extends these findings to American Indian populations in the United States. Historical trauma is not solely a product of contemporary meaning-making process but is deeply rooted in concrete family histories that continue to impact descendants.

This study also has important clinical implications. While prior research has explored the relationship between passively receiving parental communication about historical loss and individuals' depression (Matheson et al., 2020), there is a lack of studies examining the relationship between individuals' active narration of historical loss and their mental well-being. We found that mentioning historical loss events showed no direct associations with mental health outcomes. However, it moderated the relationship between cognitive availability of historical loss and anxiety, aligning with theories on how intrusive memories contribute to trauma-related symptoms (Iyadurai et al., 2019). This pattern suggests that individuals who both frequently think about and readily recall historical losses may be particularly vulnerable to anxiety symptoms, consistent with cognitive models of trauma that emphasize how accessibility of trauma-related memories can amplify psychological distress. While heightened cognitive accessibility of historical loss may exacerbate anxiety for those who readily recall historical losses, it also signals that such individuals may already be engaged in the process of confronting these memories—a necessary precursor to healing through structured narrative interventions (Pennebaker, 1997).

This moderating effect was not observed for depression or life satisfaction, the other mental health indicators examined. This indicates that the effects of historical loss can manifest selectively

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rather than uniformly across symptom domains. It underscores the need to examine mental health indicators in a differentiated manner, rather than treating them as a broad category.

Previous research has identified associations between family residential school experiences and depressive symptoms (Matheson et al., 2020) and single-item self-reported mental health (Gray & Cote, 2019). This study found such associations across specific dimensions of mental health, including positive indicators such as life satisfaction. The impact of family residential school experiences is not uni-dimensional, but two-dimensional on positive mental health outcomes as well. These findings call for clinical interventions for individuals with family residential school experience.

Limitations and Future Directions

A primary limitation of this study is its cross-sectional correlational design. Future longitudinal or experimental research could offer deeper insights into the causal mechanisms at play. Second, while our sample spans diverse ages, education levels, and locations, it relied on self-selected Internet users and was conducted only in English. Since language can mediate cultural values (Wang et al., 2010), the combination of our sampling approach and research method may bias the findings in multiple ways. For instance, findings may be skewed toward those familiar with mainstream mental health practices, given that our recruitment method and study design (e.g., including a consent form that explicitly disclosed the mental health focus of the questions) likely discouraged participation from those less acculturated to such frameworks. Future research should be conducted in person with tribal members using their tribal language.

While we documented participants' reporting of historical loss events, we did not assess at least two important elements: the level of distress associated with each event and participants' perceived causal connections between past events and present circumstances. These unmeasured aspects of historical loss narratives may explain why we found no associations with depression and life satisfaction. Future research could build on our narrative approach by prompting the content of participants' responses more deeply and examining how their understanding of historical losses' ongoing impact relates to mental health outcomes (Brave Heart & DeBruyn, 1998; Gone & Trimble, 2012; Matheson et al., 2020). This expanded analysis could reveal how individuals make meaning of historical losses and how these interpretations influence psychological well-being. Alternatively, fundamental structural causes of distress, rather than historical losses, may contribute to American Indians' mental well-being (Kirmayer et al., 2014).

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CONCLUSION

This study advances historical trauma research among American Indians by using a fluency task to examine the spontaneous reporting of historical loss events. Through this qualitative approach, we found that mentioning historical loss events aligned with both Historical Loss Scale scores and family residential school experience. While reporting historical loss events did not directly relate to mental health outcomes, it moderated the relationship between self-reported frequency of historical loss thinking and anxiety.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest.

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AUTHOR INFORMATION

Kyla R. Molina (Chickasaw Nation), PsyD, is a Clinical Psychologist at the Oklahoma City Indian Clinic.

Yi Shao, PhD, is a Professor in the Department of Psychology at Oklahoma City University in Oklahoma City, OK.

Lori Holmquist-Day, PhD, is a Clinical Associate Professor in the Department of Psychology at Oklahoma City University in Oklahoma City, OK.

Correspondence concerning this article should be addressed to Yi Shao, Department of Psychology, Oklahoma City University, 2501 N Blackwelder, Oklahoma City, OK 73106, United States. Email: yshao@okcu.edu

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Pursuing Existence: Understanding Racial Microaggressions as Experienced by Post-Secondary American Indian Students

Emily Tahy-Ceballos (Navajo Nation), EdD, Jeff Quin, EdD, Tere North, PhD, and Kristine Quade, JD, EdD

Abstract: *Despite decades of research documenting racial microaggressions across marginalized groups, American Indian post-secondary students (one of the smallest and most academically at-risk populations in higher education) have been almost entirely left out of the conversation. This qualitative descriptive study explored how American Indian post-secondary students understand and respond to racial microaggressions that cast doubt on their academic ability and potential for success. Using Microaggression Theory as the theoretical foundation, two research questions guided the study: (1) how American Indian post-secondary students come to understand the racial microaggressions they experience, and (2) how they respond to these racial microaggressions. Convenience sampling was used to recruit 10 AI/AN post-secondary students. Data were collected through semi-structured interviews and a focus group. Thematic analysis was used to analyze the data. Findings indicated that students' acknowledgment of negative experiences led to the recognition of racial microaggressions and increased awareness of limited institutional resources, which negatively affected their emotional well-being and academic success. Social support systems played a critical role in fostering resilience and determination, helping students respond to microaggressions. Participants also identified strategies for improvement, including the development of coping mechanisms, increased access to resources, and enhanced diversity and inclusion efforts on campus. These findings may assist higher education institutions in improving recruitment, retention, and completion rates of AI/AN students.*

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INTRODUCTION

American Indians and Alaska Natives (AI/AN) experience significant academic disparities compared to other racial and ethnic groups, with AI/AN students reporting the lowest college enrollment and graduation rates in the United States (Oxendine et al., 2018). In higher education, AI/ANs remain the most underrepresented population (Fish & Syed, 2018) and face disproportionate levels of discrimination, systemic injustice, and educational inequities (Walters et al., 2019). These disparities are not solely the result of individual-level factors but are embedded within broader institutional and sociocultural contexts that shape AI/AN students' daily experiences on campus (Walters et al., 2019) and include experiences of racial microaggressions. However, AI/AN students are frequently overlooked in research addressing racial microaggressions and academic success. Scholars have called for further investigation into how microaggressions influence the academic experiences, college persistence, and achievement of AI/AN students (O'Keefe & Greenfield, 2019; Palmer, 2018).

American Indian Strength, Persistence, and Higher Education

Despite centuries of systemic oppression and historical trauma, AI/AN communities possess longstanding traditions of resilience, adaptability, and collective strength that continue to sustain them today. Within higher education, this strength is evident: although AI/AN students remain the most underrepresented population in U.S. colleges and universities, they persist in the face of structural inequities, discrimination, and racialized assumptions that shape their academic journeys (Fish & Syed, 2018; Walters et al., 2019). For many AI/AN students, this persistence is rooted not only in individual determination but in responsibility to family, community, and future generations (Heavy Runner-Rioux et al., 2018; Peters, 2018). Yet, these strengths are frequently tested within academic environments that were not designed to center American Indian identities, histories, or ways of knowing, creating environments that often fail to recognize the cultural identities and lived experiences AI/AN students bring with them.

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Resilience, Coping, and American Indian Strengths

Despite ongoing exposure to microaggressions, American Indian students continue to demonstrate resilience grounded in cultural identity, family support, and community connection. American Indian teachings, spirituality, and collective responsibility have been identified as protective factors that help students navigate hostile academic environments (Hunt et al., 2020; Walters, 2019). Determination, persistence, and a commitment to honoring ancestors and future generations often motivate American Indian students to remain in higher education despite systemic barriers (Heavy Runner-Rioux et al., 2018).

However, while resilience is frequently acknowledged, far less attention has been given to how American Indian students actively interpret, resist, and respond to microaggressions as part of their academic journeys.

Racial Microaggressions in Higher Education

One persistent, yet often minimized, barrier within higher education is the presence of racial microaggressions. Racial microaggressions are subtle, often unintentional behaviors or statements that convey negative or stereotypical assumptions about marginalized groups (Sue et al., 2007). In college settings, microaggressions may occur through classroom interactions, curriculum content, advising relationships, faculty conduct, or peer exchanges. Although often framed as unintentional, their cumulative impact can undermine students' sense of belonging, academic confidence, and psychological well-being. For AI/AN students, microaggressions frequently intersect with historical erasure, cultural invalidation, and assumptions of academic inferiority, making their impact particularly harmful.

Studies across higher education contexts illustrate that microaggressions are frequently perpetrated by individuals in positions of authority, such as faculty, as well as by peers. Students have described faculty behaviors that include stereotyping, dismissing lived experiences, invalidating perspectives, and shutting down dialogue around race and identity (Davis & Mirick, 2021). In predominantly White institutions, first-generation and racially minoritized students have also reported microinvalidations, microinsults, and microassaults embedded within classroom discourse and campus culture (Ellis et al., 2019). Together, these findings highlight how microaggressions are woven into the everyday fabric of higher education.

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Distinguishing Microaggressions: Faculty, Curriculum, and Peers

Microaggressions in academic spaces are not experienced uniformly. Faculty and curriculum-based microaggressions often carry heightened consequences due to power differentials, grading authority, and institutional legitimacy. These forms may include culturally insensitive language, erasure of American Indian histories, or assumptions about academic ability. In contrast, peer-based microaggressions frequently manifest through social exclusion, racialized comments, or questioning of American Indian identity. Understanding these distinctions is essential, as the source and context of microaggressions may shape how students interpret harm and determine how or when they should respond.

Although existing literature documents these dynamics among racially minoritized students broadly, AI/AN students are often excluded from such analyses or grouped into pan-ethnic categories that obscure AI/AN-specific experiences. Quantitative and mixed-methods studies examining microaggressions among Hispanic, Asian, and Black students routinely omit AI/AN participants altogether, limiting understanding of how AI/AN students uniquely experience and interpret these encounters (Lui et al., 2020; Maiden, 2021).

American Indian & Alaska Native Students and the Absence of their Voices

When AI/AN students do appear in higher education research, their experiences are often reduced to generalized themes of racism or structural barriers, rather than explored in depth through American Indian perspectives. Qualitative studies have identified themes such as Eurocentrism, historical trauma, and barriers to education among AI/AN students, yet microaggressions are frequently treated as a secondary or peripheral finding rather than the central focus (Trammell, 2020). Moreover, the limited number of studies led by American Indian and Alaska Native scholars contributes to the continued marginalization of American Indian epistemologies and interpretive frameworks.

This absence is particularly concerning given evidence that microaggressions are associated with increased stress, depression, and diminished academic performance among students of color (Ackerman-Barger et al., 2020; Torres-Harding et al., 2020). Although one quantitative study has linked racial discrimination and microaggressions to health inequities among AI/AN college students, its scope was geographically limited and did not provide narrative insight into which experiences students found most harmful or why (Greenfield et al., 2021). As a

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result, the voices of AI/AN students themselves remain largely unheard in discussions about microaggressions in higher education.

Purpose of the Study

The existing literature reveals two critical gaps: AI/AN students are routinely excluded from microaggression research, and their own voices are rarely centered in identifying which aspects of these experiences are most harmful. Addressing these gaps requires qualitative inquiry that privileges AI/AN perspectives and lived experiences.

The purpose of this qualitative descriptive study was to explore how American Indian post-secondary students understand and respond to racial microaggressions that challenge their academic ability and success. Using a national sample of American Indian students recruited through select social media groups, this study addressed the following research questions:

1. How do American Indian post-secondary students come to understand the racial microaggressions they experience that cast doubt on their academic success?
2. How do American Indian post-secondary students respond to these racial microaggressions while persisting toward academic success?

By centering American Indian voices, this study seeks to illuminate the nuanced ways microaggressions are experienced, interpreted, and resisted by American Indian students in higher education. Understanding these responses is critical for moving past deficit narratives and advancing institutional accountability and change.

METHODS

Study Design

This qualitative study explored racial microaggressions experienced by American Indian post-secondary students. Participants self-identified as American Indian and shared their tribal affiliation, participated in in-depth interviews, and some participated in focus groups. Data focused on experiences with microaggression, coping strategies, support systems, and desired campus resources. Interviews were recorded, transcribed, reviewed for accuracy, and analyzed while maintaining participant confidentiality and researcher reflexivity.

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Researcher Positionality and Reflexivity

The primary researcher identified as American Indian and enrolled member of a Tribe. The primary researcher was enrolled in a doctoral program at the time of the study. The remaining members of the research committee (Chair, Content Expert, and Methodologist) did not identify as American Indian. To center participant voices and minimize researcher bias, reflexivity was actively practiced throughout the research process (Bengtsson, 2016; Jootun et al., 2009) and involved maintaining a reflective journal to document initial reactions, assumptions, and interpretations before and during data analysis. This process supported bracketing by increasing awareness of potential biases and encouraging intentional reflection on how the researcher's experiences could influence interpretation (Hsiung, 2008; Patnaik, 2013). Adherence to the approved IRB protocol further supported methodological rigor and reflexive practice.

Recruitment and Participants

Prior to data collection, site authorization and Institutional Review Board (IRB) approval were obtained from Grand Canyon University (IRB-2023-5365). Participants were recruited through two private social media (Facebook) groups for Native/American Indian post-secondary students. One group had approximately 1,100 members and the other had approximately 958 members at the time of recruitment. A recruitment flyer was posted in both groups and included the researcher's contact information, study purpose, inclusion criteria, and compensation details. Participants received a $15 gift card for completing an individual interview and an additional $15 gift card for participating in the focus group.

Inclusion criteria required participants to (a) self-identify as American Indian, Native American, or First American; (b) be currently enrolled in a post-secondary institution (on campus, online, or hybrid); (c) be willing to participate in the study; and (d) have experienced racial microaggressions in an educational setting.

More than 70 individuals expressed interest in the study. Of those, 15 consented to participate. Due to scheduling conflicts and participant attrition, 10 participants completed individual interviews and were included in the final sample. All focus group participants were drawn from those who completed individual interviews.

Among the 10 interview participants, six (60%) identified as female and four (40%) identified as male. Most attended post-secondary education primarily on campus, and participants were drawn from eight states. Half of the participants (n = 5) reported having lived on a reservation

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at some point in their lives, while the other half had not. The focus group included six participants, four (67%) of whom identified as female and two (33%) identified as male.

Individual Interviews

The primary data source consisted of semi-structured, one-to-one interviews conducted by the primary researcher. Interview questions were designed to explore participants' experiences, interpretations, and responses to racial microaggressions, with particular attention to interactions involving individuals in positions of authority. Interview questions were field-tested with three individuals similar to the target population to ensure clarity and relevance.

Sample interview questions included: (a) "Describe a time when you experienced racial microaggressions from a person of authority while enrolled in college," (b) "How did you respond to or cope with these experiences?" and (c) "What support systems, if any, helped you navigate these experiences?" The complete interview guide is provided in Appendix A. Each primary question included follow-up prompts to encourage elaboration. All interview questions were open-ended to allow participants to fully describe their experiences.

Interviews were conducted via Zoom, and participants received a secure meeting link prior to the scheduled interview. Prior to providing consent, participants were asked to confirm their understanding of racial microaggressions. This definition was reviewed again at the start of each individual interview to ensure shared understanding. Participants then completed a brief demographic questionnaire that collected information on age, gender, level of post-secondary education, state of enrollment, Tribal affiliation, reservation experience, and instructional modality (on campus, online, or blended). Interviews lasted an average of 40 minutes.

Focus Group

Following completion of individual interviews, interview transcripts were reviewed to identify preliminary patterns and key topics. Based on these patterns, four to six thematic scenarios were developed to guide focus group discussion. This approach allowed focus group participants to collectively reflect on shared experiences rather than respond to individual interview questions.

Sample focus group questions included: (a) "Describe microaggressions you experienced from peers and how they made you feel," (b) "How important were support systems when you experienced microaggressions from faculty or peers?", and (c) "What campus resources would have positively impacted your experience as an American Indian student?" The focus group

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questions are provided in Appendix B. The focus group was conducted via Zoom after participants agreed on a mutually convenient date and time.

Procedures

All interviews and the focus group were audio recorded using a digital voice recording application and Zoom's recording feature. Recordings were transcribed using Otter.ai automated transcription software (Otter.ai, 2023) and reviewed while listening to the original recordings to ensure accuracy. Corrections were made as needed. Each participant was assigned an alphanumeric pseudonym (e.g., P1, P2) to maintain confidentiality.

Participants received their transcripts via email for member checking and were asked to confirm accuracy or suggest revisions within five business days. Nine interview participants confirmed transcript accuracy; one participant did not respond and was assumed to have no requested revisions. All focus group participants confirmed transcript accuracy.

Data Analysis

A single coder (the primary researcher) conducted the initial analysis, and the dissertation chair reviewed the resulting codes to support the trustworthiness of the analysis. Verified transcripts were uploaded into MAXQDA 2022 qualitative data analysis software (VERBI Software, 2022) and data from the individual interviews (n = 10) and focus group (n = 6) were analyzed together to identify patterns across participants. Data were analyzed using Braun and Clarke's (2006) six-phase thematic analysis approach: familiarization with the data, generation of initial codes, theme development, theme review, theme definition, and report production. An inductive coding strategy was employed, allowing themes to emerge from the data rather than imposing a priori of categories (Thomas, 2006). Through this process, raw data were systematically transformed into codes, categories, and themes aligned with the study's research questions.

Coding System and Theme Development

First cycle coding generated an initial set of codes across transcripts. Codes were then reviewed and consolidated into a hierarchical code system consisting of parent codes and child codes. Parent codes represented broad conceptual categories (e.g., identity invalidation, stereotyping, faculty/authority interactions, peer interactions, boundary violations, emotional impact, sense of belonging, coping strategies, support systems, self-advocacy, and institutional

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resources). Each parent code included more specific child codes (e.g., under identity invalidation: misclassification as White, pressure to "choose" an identity; under faculty/authority interactions: dismissiveness, public singling out, inappropriate language). The code system was refined through iterative review as themes were developed.

To enhance credibility, coding decisions and theme boundaries were reviewed with the research committee. Differences in interpretation were discussed until agreement was reached on code definitions and final themes. Five themes were finalized; however, Theme 2 was split into two themes to clearly separate emotional impact from institutional gaps and resources, consistent with participants' accounts and reviewer feedback.

RESULTS

Findings are organized by theme, while noting whether themes reflected faculty/authority, peer, or broader campus contexts.

Theme 1: Naming and Recognizing Microaggressions in Academic Spaces

This theme reflects how participants identified and made meaning of microaggressions in their educational environments. Participants did not indicate that microaggressions were entirely unrecognized prior to the study; rather, many described a process of putting language to experiences that had previously been felt as discomfort, confusion, dismissal, or stereotyping.

Faculty- and authority-based microaggressions were commonly described as stereotyping, cultural invalidation, or disrespectful classroom interactions. For example, one participant described frustration with the way American Indian peoples were framed through deficit narratives and stereotypes, stating that American Indians were often seen as "drunks and lazy" and that coursework emphasized "the negative disparities" without historical context (Participant 1). Others described faculty actions that communicated disrespect toward American Indian culture (e.g., making fun of American Indian stories) or differential treatment in academic support, such as an instructor being "nicer to other people but not to me or my friend" (Participant 9).

Participants also described identity invalidation from faculty and staff. Some reported being categorized incorrectly (e.g., assumed to be White) or being pressured to "pick one" racial identity (Participant 2). Others described boundary violations, such as a faculty member touching

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a participant's hair without consent (Participant 2), or the use of offensive terms such as "Indian giver" (Participant 8).

Peer-based microaggressions were also present and often took the form of social dismissal or racialized comments. Focus group participants described being "scoffed at" by White peers (FGP1) and experiencing hurt when peers assumed they were White rather than American Indian (FGP2). Across sources of microaggressions, participants emphasized that these interactions communicated exclusion and devaluation within academic spaces.

Theme 2: Emotional and Academic Consequences of Microaggressions

Participants consistently described microaggressions as emotionally taxing and closely tied to their academic functioning. Many reported anxiety, anger, exhaustion, and decreased sense of belonging. These effects often accumulated over time, influencing participants' classroom engagement, motivation, and social participation. For example, participants described microaggressions as "draining" and emotionally exhausting, especially when they felt burdened with explaining American Indian identity or addressing racism while trying to focus on learning (Participant 2). Others described becoming increasingly upset when they recognized repeated exclusion or erasure, including classroom dynamics where racial groupings were discussed but American Indian identity was not acknowledged (Participant 2). Participants also described anger as a frequent response, sometimes choosing to speak up and other times disengaging to protect their emotional energy (Participant 8).

Feelings of not belonging were widespread. Several participants described withdrawing socially (Participants 3 and 4) and feeling as though they did not "fit in" academically or culturally. Taken together, these accounts illustrate how microaggressions functioned as chronic stressors that undermined emotional well-being and contributed to academic strain.

Theme 3: Multi-Level Support Systems Fostered Resilience and Persistence

Participants described resilience as supported by interconnected resources that can be grouped into individual, community, and cultural/spiritual supports. Individual supports included determination, self-talk, and selective engagement. One participant described having to "push myself mentally" to keep going (Participant 4). Others emphasized learning when to respond directly and when to preserve energy.

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Community supports included family, friends, peers, social media communities, and campus-based spaces. Several participants described validation and encouragement from others as critical, including receiving support after sharing experiences online (Participants 2 and 3). Participants also described campus-based American Indian spaces as protective environments for students who experienced microaggressions (Participant 7). For one participant, returning to college later felt more manageable because they were "more mature" and had stronger support (Participant 5).

Cultural/spiritual supports included drawing strength from ancestors, prayer, and American Indian/Tribal teachings. Participants described cultural grounding as a source of motivation and persistence, including thinking of ancestors to remain focused on long-term goals (Participant 3). These supports reinforced identity, belonging, and purpose. Overall, participants emphasized that support systems did not eliminate microaggressions, but they buffered harm, strengthened persistence, and helped students maintain academic momentum.

Theme 4: Self-Advocacy and Empowerment as Responses to Microaggressions

Participants frequently described microaggressions as catalysts for self-advocacy. Responses included confronting faculty, setting boundaries, seeking validation, educating others, and building supportive structures for American Indian students. For many, advocacy was connected to future-oriented responsibility by reducing harm for American Indian students "behind me" and creating space for those who would come next (Participant 2).

One participant described how gaining knowledge about microaggressions enabled them to speak up and reclaim power:

> I also felt more empowered having that knowledge… I know how to speak up against it now… If I didn't know what it was, I would have been just blind… Yeah, I got my power back when I stand up to people now about microaggressions. (Participant 2)

Participants also described empowerment through campus involvement, including supporting or creating American Indian student organizations (Participants 2 and 4) and using experiences as motivation to pursue further education or advocacy roles.

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Theme 5: Recommendations for Institutional Improvement and Coping Strategies

Participants identified strategies that helped them cope and offered recommendations for institutional change. Coping strategies included prayer, refocusing on goals, seeking validation, and grounding oneself in responsibility to future American Indian students (Participants 2, 3, 4, and 6). Participants also emphasized the importance of mentoring, increased American Indian faculty representation, and culturally responsive training for faculty and staff.

Participants recommended stronger partnerships between institutions and Tribal or American Indian organizations, expanded culturally relevant support services, and increased visibility of American Indian culture on campus. Focus group participants also encouraged future American Indian students to be courageous, speak up, seek support, and remember that their experiences are valid.

DISCUSSION

This study explored how American Indian post-secondary students understand and respond to racial microaggressions and how they may impact academic ability and success. Across individual interviews and the focus group, participants described various microaggressions occurring in academic spaces and explained how these experiences shaped emotional well-being, sense of belonging, and academic engagement. Findings also highlighted that students drew on layered support systems, individual determination, community support, and cultural or spiritual resources to maintain persistence. For many participants, microaggressions did not only produce harm; they also triggered self-advocacy, identity affirmation, and motivation to improve conditions for future American Indian students.

Microaggressions as Ongoing Academic Stressors

Participants consistently described microaggressions as negative experiences that affected both emotional wellness and academic functioning. Faculty and authority-based microaggressions often involved stereotyping, identity invalidation, or classroom interactions that left students feeling dismissed or singled out. Peer-based microaggressions frequently took the form of social disregard, questioning of American Indian/Tribal identity, or subtle exclusion. Regardless of source, participants described microaggressions as cumulative rather than isolated, contributing to stress, anxiety, anger, and feelings of not belonging. These emotional responses were closely tied

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to academic experiences, including decreased comfort participating in class, withdrawal from social or campus spaces, and the need to exert additional emotional labor to navigate interactions.

This finding aligns with existing literature on the cumulative and compounding nature of racial microaggressions. Masta's (2018) study of everyday experience among Native Americans similarly found that repeated, seaming minor incidents accumulated into a persistent sense of exhaustion rather than existing as isolated events. Torres-Harding et al. (2020) found that microaggressions predicted somatic symptoms among students of color through the meditating pathways of depression and perceived stress, reinforcing the connection between cumulative microaggressions and diminished wellness observed in this study. Similarly, John-Henderson et al. (2019) found that among American Indian college students, life stress and reduced sense of belonging were associated with poorer sleep outcomes, suggesting that the emotional toll of experiences like those described by participants can extend into physical and academic functioning. Douds and Hout (2020) further support the broader pattern identified here, noting that microaggressions in the United States often function cumulatively rather than as singular events, gradually shaping individuals' stress and well-being over time. Together, this literature affirms that the emotional and academic consequences described by participants in the current study reflect a well-documented pattern which repeated microaggressions, regardless of their source, accumulated into significant psychological and academic burden.

How Students Sustained Persistence: Support, Culture, and Community

Although participants described harm and frustration, they also emphasized resilience and persistence. Students relied on multiple sources of support, including family members, friends, American Indian student spaces, mentors, and online communities. Cultural and spiritual grounding, such as prayer, thinking of ancestors, and drawing on American Indian/Tribal teachings also served as a protective factor and source of motivation. These supports helped participants reframe negative experiences, reduce isolation, and reaffirm academic goals. Importantly, participants' narratives suggest that support systems are not simply "helpful"; they are often essential for maintaining well-being and staying engaged in academic environments where students experience ongoing racialized stress.

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From Harm to Action: Self-Advocacy and Empowerment

A key contribution of this study is its documentation of how participants responded to microaggressions through self-advocacy and empowerment. Some students described confronting harmful comments, speaking up in classroom spaces, or seeking validation and accountability through institutional or peer channels. Others engaged in advocacy by building community, supporting or creating American Indian student organizations, mentoring peers, or becoming more vocal about American Indian visibility on campus. Several participants described this advocacy as future oriented, emphasizing responsibility to reduce harm for American Indian students who would come after them. These responses demonstrate that American Indian students are not passive recipients of microaggressions; many actively resist, navigate, and transform hostile experiences into motivation for leadership and persistence.

Implications for Higher Education Practice

Participants' recommendations point to actionable strategies institutions can implement to reduce harm and improve American Indian students' academic experiences. Participants emphasized the need for training that addresses racial microaggressions, American Indian histories, and cultural humility in classroom interactions and advising relationships. They also highlighted the importance of greater American Indian representation among faculty and staff, which may improve belonging, reduce isolation, and increase culturally responsive support. Participants described the value of American Indian student spaces, mentoring opportunities, and collaborations with Tribal organizations including colleges and universities. Institutions can improve access to these resources and ensure they are visible and adequately supported. Finally, participants' narratives suggest a need for clear reporting and accountability pathways to report microaggressions and for institutional responses that prioritize student safety and learning climates.

Recommendations for Future Research

This study underscores the importance of continuing qualitative inquiry that centers American Indian voices. Future research should examine (a) differences in microaggressions by source (faculty/authority, peers, curriculum), (b) how students decide whether to respond directly, disengage, or seek support, and (c) which institutional supports are perceived as most effective for reducing harm. Additional work should also explore how experiences vary across institution types

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(e.g., Tribal colleges, predominantly White institutions, urban vs. rural campuses), geographic regions, and Tribal affiliations. Mixed-methods studies may be especially useful for combining the depth of qualitative narratives with broader assessments of prevalence and institutional predictors of microaggression exposure.

Study Limitations

This study has several limitations that should be considered when interpreting the findings. The sample size was small and recruited through convenience sampling via social media. As is consistent with the goals of qualitative research, this study did not aim to produce generalizable findings; rather, the intent was to generate an in-depth contextualized understanding of participant's experiences. However, the recruitment method may have shaped who chose to participate, for example, individuals who were more comfortable discussing race-related experiences online, or who were already engaged with Native American Indian community spaces on social media, may be overrepresented. Transferability of findings may be most relevant to American Indian post-secondary students with similar backgrounds, institutional contexts, or experiences to those of the participants in this study.

Tribal representation and geographic concentration may have influenced the results. Several participants attended institutions in Arizona, which may reflect regional dynamics and local institutional climates. American Indian students represent diverse Tribal nations with distinct histories, cultures, and relationships to educational institutions; therefore, experiences of microaggressions and support systems may differ across Tribal affiliations and geographic regions.

The types of post-secondary institutions attended were varied and not analyzed as a distinguishing factor. Differences in campus size, mission, availability of American Indian resources, faculty diversity, and institutional commitment to equity may shape students' experiences of microaggressions. Additionally, the use of online and blended participation may have influenced how students experienced and interpreted academic interactions.

Finally, data relied on self-reported and retrospective accounts, which may be subject to recall bias and self-selection effects. Participants who chose to engage in the study may have had stronger experiences with microaggressions or greater comfort discussing these topics. Researcher positionality may also have influenced interpretation; however, reflexive journaling, member checking, and committee review were used to support credibility and minimize bias.

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CONCLUSION AND IMPLICATIONS

This study contributes to the limited literature on AI/AN post-secondary students by centering American Indian voices to examine how racial microaggressions are understood and navigated within higher education. Findings indicate that students recognized microaggressions through repeated academic interactions and described their emotional and academic impact. At the same time, participants demonstrated resilience by drawing on social, cultural, and spiritual support systems and by engaging in self-advocacy that fostered personal growth and academic persistence.

The findings underscore the need for institutional action to reduce racial microaggressions and better support AI/AN students. Participants emphasized the importance of culturally responsive faculty training, increased American Indian representation, mentorship opportunities, and accessible campus resources. Implementing these strategies may improve academic experiences, strengthen retention, and support successful degree completion for AI/AN students in higher education.

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CONFLICT OF INTEREST

The authors declare no potential conflicts of interest.

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AUTHOR INFORMATION

Emily Tahy-Ceballos, EdD, is a member of the Navajo Nation and a doctoral graduate from Grand Canyon University in Phoenix, AZ.

Jeff Quin, EdD, is a Senior Doctoral Adjunct and Dissertation Chair at Grand Canyon University in Phoenix, AZ.

Tere North, PhD, is an adjunct faculty member in the College of Doctoral Studies at Grand Canyon University in Phoenix, AZ.

Kristine Quade, JD, EdD, is a Senior Dissertation Adjunct Team 1 at Grand Canyon University in Phoenix, AZ.

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APPENDIX A

Individual Interview Questions

1. Describe a time you believed you experienced racial microaggressions from a person of authority while enrolled. (Please explain).
   A. What was your initial reaction or understanding of the microaggression? Tell me about it.
   B. What did you do after you thought about it?
   C. What was the overall outcome of the experience for you?

2. Explain how racial microaggressions empowered or discouraged you while in class or on campus.
   A. If it discouraged you, what was your reflection of the experience and did it make you doubt your ability to academically successful?
   B. If it empowered you, what was your understanding of the event and did it encourage you to endure and become academically successful?

3. Explain how you believe you overcame racial microaggression experiences.
   A. In what ways did you respond or cope with the racial microaggression? (Example: Talk to someone about it? Did you meditate or exercise?)
   B. Do you believe your personal beliefs assisted with overcoming racial microaggressions? Please explain.
   C. What helped you the most? Please explain why.

4. Describe the support systems that you believe assisted you in overcoming racial microaggressions.
   A. Did the support come from school, peers, family, and friend? Please explain how the support assisted you.
   B. Did it help make you stronger? self-confident? more understanding of others? Explain how.

5. Explain how you perceive racial microaggression experiences influenced your overall college success and academic achievements.
   A. Do you believe it caused unnecessary feelings, thoughts, or actions? Please Explain.
   B. Do you believe it caused you to strive for success? Explain why or why not.
   C. Do you feel you had adequate resources on campus available to you in assisting with coping with racial microaggression? If so, please provide examples. If not, what type of resources were you seeking?
   D. What resources would you like to be implemented on campus to reduce racial microaggressions?

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APPENDIX B

Focus Group Interview Questions

1. Describe the microaggressions you experienced from peers. Explain how it made you feel?

2. Explain how you perceive microaggressions can influence another's student's college experiences.

3. Describe how your college experiences may have been different if you did not experience microaggressions from faculty or peers.

4. Explain how important it is to have a support system during the time you experienced microaggressions on campus from peers or faculty. What type of support systems helped you when you experienced microaggressions? Can you provide an example of how the support system helped you?

5. Describe some resources you would like to have on campus that may have a positive impact for Native American Indian students. Were any of these resources available to you? If so, explain how the resource helped you.

6. What advice would you provide for future Native American students who experience microaggressions?

7. What advice would you provide to those who are not aware of microaggressions?

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A Scoping Review of the Implementation of Medication-Assisted Treatment in Indian Country: Integration of Cultural Practices and Barriers

Neshay D'Silva, MEd, Brooke de Heer, PhD, Sydney Shevat, MS, Pamela Buzzard, MLIS, Shane Haberstroh, EdD, and Juliette Roddy (Ojibwe, Sault Ste. Marie Tribe), MBA, PhD

Abstract. *American Indian and Alaska Native (AI/AN) people experience high rates of opioid misuse and disproportionate barriers to treatment services, yet our understanding of the effectiveness of and barriers to medication-assisted treatment (MAT) in Indian Country is limited. The aim of this scoping review was to synthesize research on MAT for opioid use disorders within AI/AN communities across the United States and examine how this treatment approach has been put into practice, studied, or addressed within those populations. A total of 153 articles were reviewed, and 27 articles met the inclusion criteria. The studies included were conducted across the United States, representing all age groups, and encompassing both urban and rural AI/AN community groups engaged in MAT for opioid use disorder. Only a small number of studies focused on effectiveness of MAT for AI/AN populations, with the vast majority focusing on various systemic barriers. Findings also revealed the need to integrate Indigenous cultural traditions and holistic wellness approaches in MAT. Based on this review, we provide recommendations for future MAT interventions including the expansion of telehealth and incorporating unique elements of AI/AN culture to help bridge the gaps in access to care.*

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INTRODUCTION

Mortality rates due to opioid overdoses among American Indians and Alaska Natives (AI/AN) are notably high, exceeding all other racial or ethnic groups in 2021 (Kariisa et al., 2022). However, data on non-medical use of prescription drugs, such as opioids, within AI/AN populations in the United States are scarce. Available information from one tribal study indicated a concerning trend: 47% of individuals aged 18-25 reported at least one-lifetime use of non-medical use of prescription drugs, a rate significantly higher than the 5% average observed across the United States (Venner et al., 2018).

Historically, treatment protocols, clinical trials, and health research related to substance use predominantly focused on cisgender White male populations. This approach inherently assumes that results obtained from these populations are universally applicable, a perspective that overlooks the unique needs and experiences of diverse groups. Notably, Indigenous communities endured historical trauma (Brave Heart, 2003) in the aftermath of violent colonization and experienced subjugation to unethical research practices in the past (Hodge, 2012). These factors not only placed these communities at higher risk of experiencing negative health outcomes but also cultivated a sense of hesitance towards participating in health research initiatives, thus partially explaining issues related to access to treatment as well as limited research that evaluates the effectiveness of those treatments in AI/AN populations.

Currently, opioid use disorder (OUD) treatment has three medications approved for safe and effective use: buprenorphine, methadone, and naltrexone (Food and Drug Administration, 2024). Medication-assisted treatment (MAT) is the use of these medications in combination with counseling and behavioral therapies to treat OUD. Clinical trials investigating these medications, typically using predominantly White samples, have consistently demonstrated that medication-assisted treatments yield substantially better outcomes, such as reduced overdose mortality, reduced death risk, improved treatment retention, and improved psychosocial outcomes in treatment compared to psychosocial interventions alone (Connery, 2015; Sordo et al., 2017; Riblet et al., 2020; Mattick et al., 2014; Victor et al., 2023). Although these results are promising, research that assesses the effectiveness of MAT specifically in marginalized populations, with particular attention to cultural and ethical considerations, is limited. Further, AI/AN communities may be

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understandably reluctant to engage in Western treatment programs that do not reflect their cultural practices, customs, and traditions (Zeledon et al., 2022).

In the last five years, a number of review articles have provided information on the current state of the literature related to substance use disorder (SUD) and treatment within AI/AN populations. Nalven et al. (2021) identified the underrepresentation of AI/AN people, along with other marginalized groups, within randomized clinical trials focusing on opioid pharmacological treatment in the United States. Crouch et al. (2023), in a review of AI/AN participants included in studies in the National Institute of Drug Abuse Clinical Trials Network (CTN), found that stigma, discrimination, or lack of culturally grounded resources were contributing factors to higher rates of substance use in AI/AN populations. They also determined that a number of studies in the CTN that included AI/AN participants reported using community-based participatory research (CBPR) or tribal participatory research approaches when designing and implementing studies. Similarly, in their review of culturally tailored interventions for AI/AN substance use, Richer and Roddy (2023) found that despite the fact that most studies utilized a CBPR approach, generally there is a dearth of culturally relevant treatment programs, and studies that evaluate the programs in a comprehensive way are limited. Additionally, Mpofu et al. (2021) conducted a scoping review of articles that investigated the continuum of care for OUD in rural AI/AN communities including prevention, treatment, and/or care perspectives and identified the need for MAT cultural adaptations for AI/AN people. Comparative research from Canada and Australia is more readily available and has shown that Indigenous opioid users were less likely to receive traditional methadone therapy and were slower to initiate the use of methadone treatment when offered (Kerr et al., 2005; Venner et al., 2018). Other research identified lack of Indigenous providers and the emphasis on abstinence-based recovery as other factors for lower treatment engagement in Indigenous individuals (Rieckmann et al., 2017; Venner et al., 2018).

Given the efficacy of MAT for OUD treatment in mostly White populations, and the identification of an existing gap relative to MAT for substance abuse in AI/AN populations, the current study seeks to synthesize the existing literature on the topic and identify key gaps and takeaways to better serve AI/AN communities. The primary objective of this scoping review was to examine the current state of literature pertaining to MAT for OUD/SUD effectiveness and barriers to care in AI/AN groups in the United States. This involved a comprehensive analysis of peer-reviewed articles that reported on implementation, assessment, or discussion about MAT for

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AI/AN adults who used opioids, other illicit drugs, and alcohol. We aim to illuminate the current landscape of research in this area and identify potential avenues for intervention development tailored to the needs of AI/AN communities.

METHODS

We utilized a scoping review to identify primary literature relating to MAT for AI/AN people living on tribal lands or in metropolitan areas. While conducting the scoping review to find relevant literature and studies, we collaborated with the university librarian to tailor our search strategy. Our review followed the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021). The PRISMA-ScR checklist is included as Appendix C, along with a defined search strategy (Appendix B), that outlined the grounds and purpose of the study, such as inclusion and exclusion criteria, study selection, and data extraction (Page et al., 2021; Richer & Roddy, 2023).

Search Strategy

Inclusion and Exclusion Criteria

This scoping review included peer-reviewed studies involving MAT for substance use intervention for AI/AN peoples living in the United States. Any studies that did not specifically focus on treating AI/AN peoples in the United States were excluded from the review. We included studies that focused on AI/AN people living on rural reservations and those living in metropolitan areas. Only studies that explored MAT for self-identified AI/AN people over the age of 18 were included in the review. All modes of delivery of MAT were included such as in-person and online, as well as in any intervention setting, such as individual or group settings. We included only English-language articles published in or after the year 2000. We excluded all studies that did not specifically refer to MAT or the corresponding treatment drugs for AI/AN people over the age of 18, as well as studies that were not written in English-language, those published before the year 2000, and those not peer-reviewed. Dissertations and theses were not intentionally excluded; however, none were captured in the searches conducted across our selected databases. Additionally, studies that included research with U.S.-based tribal communities in combination with Indigenous populations outside the United States were excluded to maintain a focused scope on U.S. tribal contexts.

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Study Selection

We conducted electronic searches across four databases, PubMed (direct access), PsycINFO (EBSCOhost), CINAHL (EBSCOhost), and Academic Search Complete (EBSCOhost), in September 2022. The search remained open throughout manuscript development and was actively monitored through August 2024, allowing us to include relevant articles published after the initial database export. The search strategy, developed in collaboration with a university research librarian, was applied uniformly across all platforms. The number of citations imported from each database were as follows: PubMed (1,502), PsycINFO (974), CINAHL (778), and Academic Search Complete (2,518). Search terms included keywords and subject headings related to MAT, opioid and alcohol use disorders, and AI/AN populations. The full search strings for each database are provided in Appendix B. While our search strategy included terms for MAT related to both opioid and alcohol use disorders, the majority of included studies focused on opioid-related MAT. Therefore, the synthesis and framing of this review primarily emphasize MAT for opioid use disorder in AI/AN communities.

Search terms within each search string were connected with the 'OR' Boolean operator. Search terms for each search string are as follows:

1. **AI/AN and Indigenous**: "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
2. **Substance use/misuse**: "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
3. **Medication-assisted treatment**: "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR

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"Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

After the initial search strings were developed, they were combined with the following Boolean operators: string 1 AND string 2 AND string 3.

Covidence Review Software

This study utilized Covidence software to organize and manage the scoping review (Covidence Systematic Review Software, 2022). Once the searches using the Boolean terms identified above were conducted, Covidence (2022) removed duplicate articles. In total, 3,150 article abstracts were reviewed to determine their eligibility for full-test review. Authors screened the articles independently using the inclusion and exclusion criteria. Each article had to be reviewed by two authors, and given an inclusion rating of "yes," "no," or "maybe." If the reviewing authors' ratings conflicted, a third author gave a final rating for the article after discussing conflicts and coming to a consensus. If it was unclear to the author whether to include or exclude an article, then the article was selected for full-text review. Upon completing the review of the articles, some of the articles chosen for full-text review did not have a full-text available. The authors attempted to find the full text of the articles electronically and uploaded them into Covidence. If the full text was not accessible electronically, the article was excluded from the review.

The authors reviewed 153 full-text articles to determine if they should be included in the final data extraction phase in Covidence. Similar to the abstract review process, authors discussed conflicts adhering to the exclusion and inclusion criteria. Out of the 153 articles in the full-text review phase, 27 were determined to meet the inclusion/exclusion criteria and were moved to the final data extraction phase. Articles that specifically indicated MAT or medication-assisted treatment or treatment with medication for OUD (MOUD) in the article were tagged as "MAT included." Articles that included residential facilities or treatment were tagged as "Residential Tx included." Articles that did not specify MAT or residential treatment were tagged as "Unspecified Tx." The review team also reviewed references of relevant articles, but this did not yield any additional studies. The search process was tracked using a PRISMA flow diagram (Figure 1).

Quality Assessment

A quality assessment matrix was created within Covidence in order to appraise the quality of each of the included articles according to a bias rating. Utilizing the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018; Pace et al, 2012), which provides quality assessment questions

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for qualitative, quantitative randomized control trials, quantitative nonrandomized, quantitative descriptive, and mixed methods studies, each research article was assessed according to the chosen methodology and design. Response options of "yes," "no," and "can't tell" are available for all quality assessment questions with "yes" responses indicating low bias. All studies included were rated as adequate (4) to low bias (5) with the exception of two of the articles which could not be rated because they were structured as reports and did not fall under either a qualitative, quantitative, or mixed methods classification (see Appendix A, Table A1). Through discussion, the research team chose to include those articles because both included important contributions to the topic of MAT considerations in Indigenous communities that were not captured in other studies.

Data Synthesis

A preliminary data extraction table was created and iteratively refined based on feedback from the review team. Following the full-text screening and data extraction in Covidence, two lead researchers conducted an in-depth review of the extracted data to ensure accuracy and identify areas needing clarification. To improve clarity and coherence, author names and year of publication were merged into a single column, while geographic region and tribal or urban designations were also consolidated into one. Additional columns were created for study aims, methodology, sample size, substance(s) addressed, and key findings. A final column captured quality assessment ratings for each included study. The review team collaboratively synthesized the extracted data to align with the review's aims. The lead authors drafted the initial synthesis, and all coauthors contributed revisions, discussion points, and recommendations in an iterative process until consensus was reached on the final presentation.

RESULTS

Sources of Evidence

An initial search resulted in 5,772 articles, of which 2,622 were identified as duplicates by Covidence and removed. This resulted in 3,150 screened articles. Of these, 2,995 articles were screened that did not focus on medication-assisted treatment or Native, AI/AN, or Indigenous populations (n = 153). Of the 153 full-text articles screened, 126 articles were excluded because they did not specify medication assisted treatment/therapy (n = 85), did not address the Native,

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AI/AN, or Indigenous population (n = 33), focused on children or youth population rather than adult populations (n = 3), did not address the U.S. population (n = 3), or were published before the year 2000 (n = 2), based on the inclusion criteria. Twenty-seven full-text studies are included in this scoping review.

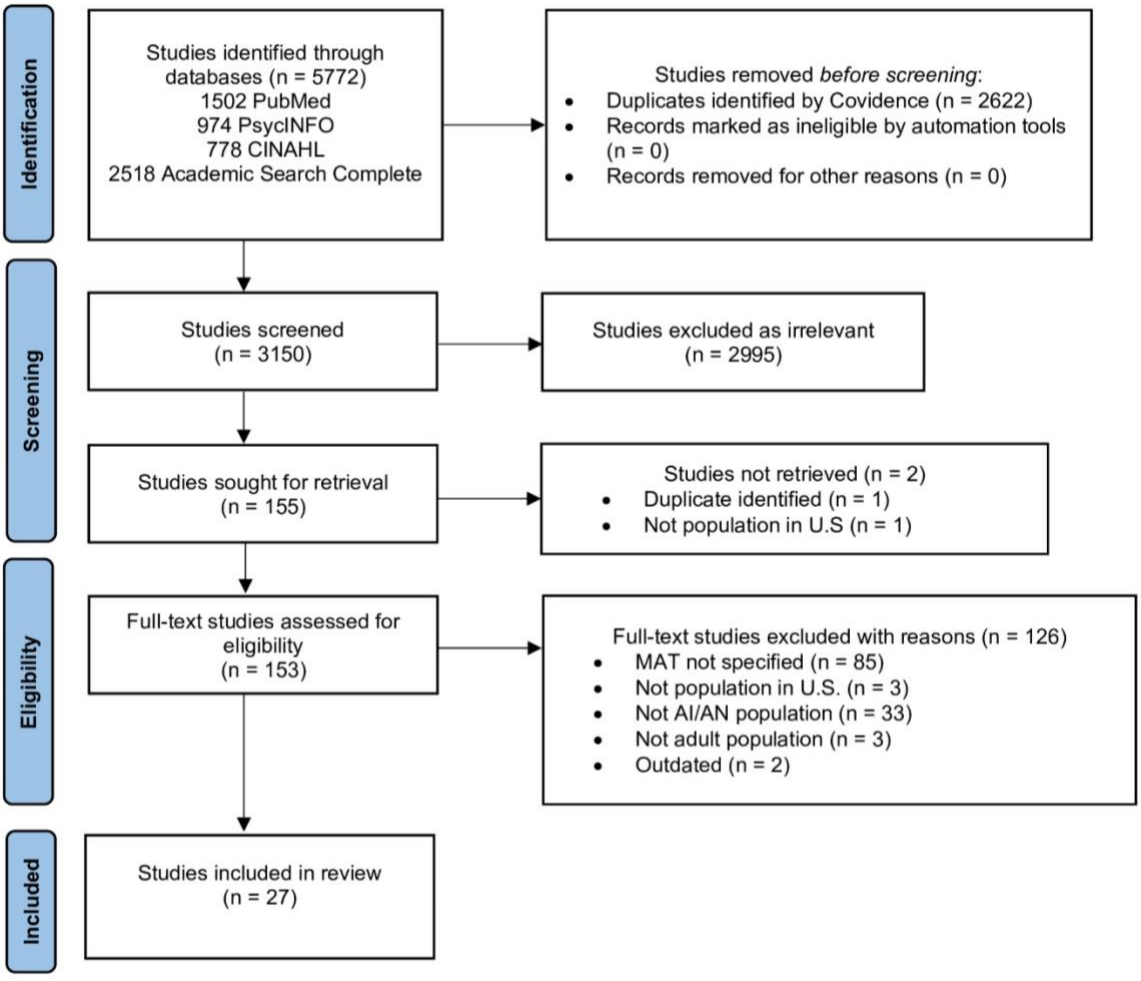


Figure 1. PRISMA flow diagram updated from Covidence

Characteristics of Included Studies

Study characteristics of the 27 studies are described in Table 1. Twenty-three studies presented findings for MAT interventions and outcomes among AI/AN communities and four of the included articles are reviews of the literature or reports on MAT frameworks and intervention. Of these, sixteen studies were conducted in rural and/or tribal communities or areas of Indian

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Country (Anastario et al., 2022; Boyd et al., 2021; Duvivier et al., 2017; Katzman et al., 2020; Kelley et al., 2021; Krawczyk et al., 2021; Lillie et al., 2021; Morones et al., 2021; Mpofu et al., 2021; Novins et al., 2011; Novins et al., 2016; O'Malley et al., 2008, 2020; Tipps et al., 2018; Zeledon et al., 2020; Zeledon et al., 2022) and others were conducted in Urban regions (El Ibrahimi et al., 2022; Running Bear et al., 2022; Zeledon et al., 2022). Fifteen studies were conducted across the United States (Dunphy et al., 2022; Hirchak et al., 2022; Krawczyk et al., 2021; Marotta et al., 2020; Mpofu et al., 2021; Nalven et al., 2021; Novins et al., 2011; Novins et al, 2016; Pro et al., 2022; Pro et al, 2020; Pro & Zaller, 2020; Rieckmann et al., 2017; Tipps et al., 2018; Venner et al., 2018; Yang et al., 2020), whereas the others included regions of Oregon (El Ibrahimi et al., 2022), New Mexico and Washington (Katzman et al., 2020), Utah (Kelley et al., 2021), Alaska (Lillie et al., 2021; O'Malley et al., 2008; Running Bear et al., 2022), Arizona (Morones et al., 2021), Minnesota (Boyd et al., 2021), Oklahoma, Montana and South Dakota (Anastario et al., 2022), and California (Zeledon et al., 2020; Zeledon et al., 2022).

More than half of the studies, 14 of the 27 articles, presented cultural practices related to and integration in MAT for OUD among the AI/AN populations (Anastario et al., 2022; Boyd et al., 2021; Duvivier et al., 2017; Katzman et al., 2020; Krawczyk et al., 2021; Mpofu et al., 2021; Nevins et al., 2011; Novins et al, 2016; Rieckmann et al., 2017; Running Bear et al., 2022; Tipps et al., 2018; Venner et al., 2018; Zeledon et al., 2020; Zeledon et al., 2022). Furthermore, 14 of the 27 articles (52% of the studies) addressed disparities and barriers to access to MAT. All but one study included OUD, with that study specifically addressing MAT for alcohol dependence (O'Malley et al., 2008). Others focused on alcohol-use disorder *and* OUD (Running Bear et al., 2022), or all substance-use disorders (Novins et al., 2011; Novins et al, 2016; Rieckmann et al., 2017).

Efficacy of MAT Interventions in Indian Country

Among the 27 studies reviewed, only three studies (El Ibrahimi et al., 2022; O'Malley et al., 2008; Pro et al., 2020) offered outcome data related to effectiveness of MAT intervention for AI/AN populations, whereas other studies included in the review typically investigated other elements related to MAT for AI/AN people, including barriers to MAT (discussed below). The three studies that assessed effectiveness of MAT for AI/AN people found promising results with MAT reducing opioid and alcohol use in the samples (El Ibrahimi et al., 2022; O'Malley et al., 2008; Pro et al., 2020). Notably, it was not within the scope of these articles to discuss cultural

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relevance or considerations of MAT within AI/AN populations. This is a particularly important piece given the historical context of colonial oppression and violence that has implications for understanding disparate rates of MAT accessibility as well as effectiveness.

Barriers to MAT in Indian Country

Fourteen studies assessed the systemic barriers to access to care and treatment services. Geographic barriers were noted by 7 studies, including living on the reservation with limited access to ancillary services in integrated behavioral health (Anastario et al., 2022; Katzman et al., 2020; Krawczyk et al., 2021; Tipps et al., 2018; Venner et al., 2018; Zeledon et al., 2020) and significant travel times to obtain treatment services (Kelly et al., 2021). Structural barriers were reported by 5 studies, including low offerings of buprenorphine in Indian Health Service (IHS) or tribal government-run treatment facilities (Morones et al., 2021; Yang et al., 2020), statistically significant lower receipt rates of buprenorphine and Vivitrol among AI/AN groups particularly due to lack of prescribers in the area (Dunphy et al., 2022; Kelly et al., 2021), and an overall low rate of MAT implementation in programs for AI/ANs (Rieckmann et al., 2017). Novins et al. (2011) highlighted concerns with the lack of flexibility related to diverse needs of clients, both clinically and culturally, in evidence-based interventions including naltrexone, methadone, buprenorphine, and other medications for both AI/AN and non-AI/AN communities in tribal regions across the United States.

Marotta et al. (2020) found that AI/ANs, along with African Americans and Latinx individuals, were at a greater risk of discharge from MAT due to incarceration, particularly for those in treatment for the use of heroin, benzodiazepines, synthetic opioids, cocaine, and non-prescription methadone. Further, El Ibrahimi et al. (2022) found AI/AN individuals interested in treatment for heroin and meth use received 56% less MOUD services and significantly shorter durations of treatment. Similarly, Pro et al. (2020) reported that AI/AN individuals who had been through some form of methadone treatment were more likely to face discrimination versus those who had never been in treatment, posing an additional barrier to treatment services among this group. Three studies across the nation revealed that AI/AN individuals faced a low rate of MAT implementation in substance use treatment programs (Rieckmann et al., 2017) and were less likely to receive MAT due to factors such as homelessness, history with law enforcement, incarceration, and co-use of substances like alcohol and benzodiazepines (Krawczyk et al., 2021; Marotta et al., 2020). Furthermore, in Alaska, AI/AN patients with polysubstance or co-occurring substance use

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were at a higher risk of discontinuing MAT (Lillie et al., 2021). Although one study did find AI/AN communities showed higher availability of national prescribers with waivers to prescribe MOUD, the availability of waiver prescribers may pose an obstacle for AI/ANs in rural areas (Hirchak et al., 2022).

To address barriers to MAT in Indian Country, Duvivier et al. (2017) pursued training for opioid prescribing and enhancing services for broadening access to MAT within IHS. Additionally, there has been focus on improving availability of naloxone as a response to opioid overdose with one study finding that equipping first responders with naloxone in rural areas can reduce the risk of prescription opioid overdoses (Morones et al., 2021). However, in spite of these steps being implemented by IHS, inadequate staff, out-of-date equipment, restrictions of access in IHS facilities, and failure to meet Medicare requirements (Morones et al., 2021; Tipps et al., 2018) still exist. There have been documented issues of quality of care and oversight of IHS-operated hospitals that involve noncompliance with the Medicare Conditions of Participation (CoPs) and the Emergency Medical Treatment and Labor Act (EMTALA) that likely will play an ongoing role in broadening access to MAT within IHS structures (U.S. Department of Health and Human Services Report, 2019). One additional finding from the review in regards to addressing the barrier of accessibility to MAT given isolated geographic locations of many tribal communities and possibly ease the burden on IHS hospitals may be through the expansion of telehealth. Studies have identified that virtual models have increased clinician capacity to serve underserved communities and will likely provide a path forward to increase access and availability of MAT in Indian Country (Katzman et al., 2016; Tipps et al., 2018).

Cultural & Traditional Practices in MAT Interventions in AI/AN Communities

Fourteen studies highlighted the importance of cultural components implemented alongside MAT (Anastario et al., 2022; Boyd et al., 2021; Duvivier et al., 2017; Katzman et al., 2020; Krawczyk et al., 2021; Mpofu et al., 2021; Novins et al., 2011; Novins et al., 2016; Rieckman et al., 2017; Running Bear et al., 2022; Tipps et al., 2018; Venner et al., 2018; Zeledon et al., 2020; Zeledon et al., 2022). Many of these focused on restoring cultural connection to the people and land, integration of Indigenous and Western practices, and use of traditional healers to connect with the culture to build a sense of belonging and support. These results are presented in Table 1.

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Anastario et al. (2022) advocate for a decolonized approach that identifies and dismantles harmful systems and institutions in light of findings that suggest that Indigenous persons who use injection drugs expressed issues with existing Indigenous-based treatment models, such as the medicine wheel. Boyd et al. (2021) evaluated data in a rural tribal nation in Minnesota and found that the Cascades of Care services included the adoption of the medicine wheel, multiple dimensions of wellness, and traditional ceremonies in their culturally tailored and community-based approaches to OUD treatment. The authors highlighted the importance of culture within OUD treatment, including the use of tobacco, thanking the spirits, and using holistic wellness approaches such as drumming and sweat lodges (Boyd et al., 2021). Duvivier et al. (2017) suggested a focus on effective pharmacy-based harm reduction programs for opioid users and designed multimodal approaches to pain treatment by including aspects of behavioral health treatment, physical therapy, and occupational therapy (Duvivier et al., 2017). They further developed culturally sensitive materials to increase levels of trust and health connection and created training techniques to improve motivational interviewing and health coaching to reduce stigma among AI/AN groups (Duvivier et al., 2017). Katzman et al. (2020) surveyed 38 IHS clinicians who identified key themes of inclusion and respect in chronic pain and opioid management. Facilities serving AI/AN patients, particularly those operated by tribal governments and those with staff speaking Native languages, were found to offer lower rates of agonist maintenance therapy such as methadone or buprenorphine, possibly due to a lack of fit of these treatments in cultural and traditional practices (Krawczyk et al., 2021).

Three studies found family and community involvement in MAT services, including community members and traditional healers, to be a protective factor in the treatment of substance use (Running Bear et al., 2022; Mpofu et al., 2021; Zeledon et al., 2020). A scoping review reported that 5 of the 8 included studies found that rural participants preferred culturally focused health and wellness interventions that involved families and community members, whereas the remaining 3 studies reported the need for cultural adaptation of MAT. One of the studies proposed to use culturally adapted behavioral approaches to OUD treatment (Mpofu et al., 2021). Through mixed-methods research approaches, Novins et al. (2011) analyzed the effectiveness and cultural fitness of SUD treatment for AI/AN communities and integration of traditional practices and found the need for tribally specific approaches in treatment, particularly considering each tribe's unique historical, political, and cultural contexts. In another study, Novins et al. (2016) examined the level of engagement with EBTs in SUD treatment programs serving AI/ANs and found that only

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Motivational Interviewing (MI) and Relapse Prevention Therapy were found to be culturally appropriate programs for AI/AN clients. When evaluating MAT for SUD treatment and barriers for AI/ANs, Rieckman et al. (2017) highlighted the importance of adapting EBTs culturally to the needs of AI/AN communities.

Tipps et al. (2018) found that smaller tribes with concentrated geographical land may benefit from community action programs encouraging community members to take ownership of the opioid crisis that impacts their very own families, friends, and neighbors. Lastly, from a panel discussion with AI/AN community members emerged themes of integrating MAT with holistic and traditional healing through the utilization of Indigenous healing approaches, "translating" Western MAT interventions to AI/ANs, and eliciting perspectives from Indigenous stakeholders including elders, and traditional healers, particularly following community-based participatory research (Venner et al., 2018).

DISCUSSION AND IMPLICATIONS

The aims of this review were to synthesize the existing literature on MAT for substance use disorders among AI/AN populations in the United States and assess how MAT has been implemented, evaluated, or discussed in AI/AN communities. Findings from the 27 studies identified key barriers, facilitators, and culturally grounded approaches that may inform future research and practice. Several important trends are identified through the review. MAT, particularly for OUD, has been implemented in both rural tribal and urban AI/AN contexts, with some evidence of its effectiveness in reducing substance use and improving treatment outcomes (El Ibrahimi et al., 2022; O'Malley et al., 2008; Pro et al., 2020). However, only few studies provided outcome data, and most focused instead on access-related barriers or structural challenges in implementation. These barriers included geographic isolation, lack of trained prescribers, inadequate infrastructure in tribal or IHS-run facilities, and the stigma surrounding MAT within communities (Duvivier et al., 2017; Hirchak et al., 2022; Katzman et al., Kelley et al., 2021; Krawczyk et al., 2021; Lillie et al., 2021; Morones et al., 2021; Rieckmann et al., 2017; Tipps et al., 2018; Yang et al., 2020).

Despite established evidence of MAT's effectiveness in the general U.S. populations (Venner et al., 2018), its cultural and contextual adaptation for AI/AN communities remains limited. This review underscores a significant gap in culturally adapted and community-specific

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MAT programs. Importantly, 14 studies described culturally relevant practices or recommendations, such as integration of traditional healers, the use of sweat lodges and drumming in treatment, or the need to adapt evidence-based practices like Motivational Interviewing to align with Indigenous values (Boyd et al., 2021; Mpofu et al., 2021; Novins et al., 2016; Zeledon et al., 2022). However, few studies evaluated the impact, indicating a significant gap in evidence-based models of culturally integrated MAT. It is notable that traditional practices, such as sweat lodges, community involvement, and spiritual healing, were identified as promising additions or complements to Western MAT models (Anastario et al., 2022; Forcehimes et al., 2011; Legha & Novins, 2012; Lopez et al., 2021). However, these practices remain underutilized or inconsistently integrated. This points to the need for community-led research and intervention models that foreground Indigenous knowledge systems and healing frameworks (Ricker & Roddy, 2023; Venner et al., 2018).

Although telehealth was not a central focus of the studies included, a few referenced virtual delivery models for MAT. Existing evidence suggests that virtual models such as the IHS Pain and Addiction TeleECHO clinic have significantly enhanced clinician capacity in managing OUD, particularly in rural and underserved AI/AN settings (Katzman et al., 2016). Given the geographic isolation of many AI/AN communities, expanding telehealth services represents a critical frontier for addressing access barriers. The IHS implemented progressive strategies in this area, such as requiring providers to check state Prescription Drug Monitoring Program (PDMP) databases before issuing opioid prescriptions exceeding seven days and mandating the Essential Training on Pain and Addiction for all prescribers (Tipps et al., 2018). To support MAT delivery, IHS clinicians are also granted access to online buprenorphine certification, enabling expanded prescribing in remote and underserved settings. Recent federal policy changes further support the implementation of telehealth-based MOUD in tribal communities. As of 2025, rules from the Drug Enforcement Administration (DEA) and U.S. Department of Health and Human Services (HHS) permit the prescribing of buprenorphine via telemedicine, including audio-only visits, for up to six months without an in-person evaluation (DEA & HHS, 2025; SAMHSA, 2025). While these developments occurred after the data collection period for most of the reviewed studies, they have significant implications for future implementation and should be closely monitored in ongoing research.

Overall, while MAT has been found to be effective in AI/AN communities, it continues to encounter significant barriers and is underrepresented in studies on OUD, especially those focusing

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on groups with low socio-economic status indicators such as employment, income, and homelessness (Nalven et al., 2021). Incorporating decision-making and participation from community members and stakeholders, prioritizing unique community policies and practices, and emphasizing community-based research collaboration with AI/AN communities (Novins et al., 2011) are essential strategies for improving OUD treatment.

Implications for Research and Practice

Findings from this review point to three central implications. First, there is a need for culturally integrated MAT models. While nearly half of the included studies referenced cultural considerations, few implemented or evaluated culturally grounded MAT programs. Interventions rooted in Indigenous worldviews and co-designed with community members are urgently needed to ensure treatment is culturally rooted and acceptable to AI/AN patients (Boyd et al., 2021; Zeledon et al., 2020). Second, structural barriers need to be addressed and telehealth options expanded. AI/AN communities continue to face disproportionate barriers to accessing MAT, including provider shortages, travel distance, and facility under-resourcing (Dunphy et al., 2022; Yang et al., 2020). Recent policy changes allowing telehealth prescribing of buprenorphine without an in-person visit (DEA & HHS, 2025; SAMHSA, 2025) offer a promising strategy to expand access in underserved areas. Lastly, there is a need for rigorous and community-driven outcome research. Only a few studies reported on treatment outcomes or effectiveness, and even fewer examined culturally tailored interventions. Future research should include multi-method evaluations and CBPR approaches to assess the efficacy of culturally relevant MAT models in diverse tribal contexts (Novins et al., 2011; Lopez et al., 2021; Richer & Roddy, 2023).

Limitations and Methodological Note

This review chose to cast a wide net related to the current state of the literature on MAT for SUD/OUD in AI/AN populations in an effort to capture varied approaches to studying the topic and reach a more holistic understanding of the potential effectiveness and limitations of MAT for AI/AN communities. As such, an array of methodological techniques and processes were included, ranging from RCTs to qualitative interviews to systematic reviews and reports from working groups. Although this variability strengthens our overall understanding of what research has been conducted and what gaps still exist, it also creates some ambiguity relative to more specific research questions and an assessment of the quality of the research. Following the work of Tuhiwai

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Smith (2021), the methodological approach used in the current review was purposeful in the inclusion of different kinds of research that may not meet typical Western standards of the highest level of research (i.e., RCT). Articles that centered Indigenous community involvement and/or AI/AN voices were included in recognition of decolonized approaches and Indigenous ways of knowing. Future scoping reviews may benefit from broader grey literature searches, community-based research, and other non-indexed materials relevant to Indigenous health and substance use.

CONCLUSION

This review contributes to understanding MAT implementation in Indian Country by identifying common barriers, emerging practices, and persistent research gaps. While MAT shows promise in treating substance use disorders in AI/AN communities, its success requires alignment with Indigenous cultural and community frameworks. Centering Indigenous knowledge systems, improving health infrastructure, and engaging in ethical, community-led research are necessary steps to address disparities in access, engagement, and outcomes.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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AUTHOR INFORMATION

Neshay D'Silva, MEd, is a PhD student in Combined Counseling and School Psychology at Northern Arizona University in Flagstaff, AZ.

Brooke de Heer, PhD, is an Associate Professor in Criminology and Criminal Justice at Northern Arizona University in Flagstaff, AZ.

Sydney Shevat, MS, is PhD student in Sociology at the University of Tennessee – Knoxville in Knoxville, TN.

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Pamela Buzzard, MLIS, is an Associate Librarian at Northern Arizona University in Flagstaff, AZ.

Shane Haberstroh, EdD, is a Professor in Educational Psychology at Northern Arizona University in Flagstaff, AZ.

Juliette Roddy (Ojibwe, Sault Ste. Marie Tribe), MBA, PhD, is the Wurgler Chair of Criminal Justice at Northern Arizona University in Flagstaff, AZ.

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APPENDIX A

Table A1

Studies assessing barriers and cultural integration in MAT in Indian Country

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
Anastario et al., 2022	- OK, MT, SD - Tribal	Understanding perspectives of Indigenous persons who use injection drugs (IPWIDs) and key stakeholders across multiple sectors in health care and treatment accessibility on tribal lands.	- Qualitative methods - In-depth qualitative interviews using an inductive analytic approach.	- N = 60 including 30 IPWIDs and 30 stakeholders. - Participants reported current or former injection drug use and/or being a provider of social or health services to injection drug users, living on or near one of the identified tribal sites - Ages between 18-40 years.	Opioid use; Injection of stimulants, opioids and diverted medications	- Participants (IPWIDs) demonstrated significant interest in obtaining a sanctioned MAT, however found it difficult to obtain. - Participants faced geographic barriers to receiving MOUD living far from reservations to ensure access to treatment. - Indigenous-based treatment models (such as programs including Medicine Wheel) and not always desirable in terms of physical accessibility and spiritual and abstinence-based requirements.	4
Boyd et al., 2021	- MN - Tribal	Examine the extent to which the OUD Cascade of Care stages could be quantified for a specific tribal nation in Minnesota using existing data sources and compare the Cascade of Care for that tribal nation to the entire state of Minnesota through a framework that emphasizes Indigenous data sovereignty and governance.	- Mixed methods Community-based participatory research (CBPR) Cross-sectional study - Quantitative analysis of Data obtained from the Minnesota Drug and Alcohol Abuse Normative Evaluation System (DAANES) at different stages in Cascade of Care.	- N = 269 that included clients who were admitted to substance use treatment programs in 2018. - Ages 18 years or older - Identified opioids as a primary, secondary, or tertiary substance needing to be addressed at treatment admission - All clients were AI and admitted to a tribally-run treatment clinic located in the reservation.	Opioid Use Disorder (OUD)	- A larger percentage of the tribal community sample received MOUD compared to the all-Minnesota sample. - Among participants, 65–99 % initiated medications for OUD and 13–41 % were retained in treatment for at least 180 days. - Anji'bide community advisory board highlighted the importance of culture in OUD treatment (such as the use of tobacco, thanking the spirits, drum and sweat lodge ceremonies, holistic wellness approaches, etc.) - Along with culturally tailored treatment, having a community-based approach for both OUD treatment and research surrounding OUD treatment is important. - Although Venner et al. (2018) note a preference among some American Indian communities for OUD treatment without medications, in this sample MOUD was more widely used in the tribal/reservation than in the full-state sample	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
						although preference in previous studies demonstrated AI communities preferred OUD treatment without medications. - Cascade of Care in tribal nations utilized community-based approach and culturally tailored approach to OUD treatment (including the adoption of a medicine wheel, multiple dimensions of wellness, and traditional ceremonies).	
Dunphy et al., 2022	- No specified regions in U.S.	Analyze the racial/ethnic disparities in the administration of medications for opioid use disorder among Medicaid patients diagnosed with this condition.	- Quantitative methods - Analyzed data from the Centers for Medicare and Medicaid Services Transformed Medicaid Statistical Information System (T-MSIS) covering 2017 to 2019. - Primarily measured the receipt of buprenorphine or Vivitrol post-diagnosis, excluding methadone and buprenorphine for pain due to data limitations. - Controlled for factors like race/ethnicity, comorbidities, and prescription drug use before diagnosis, and assessed how these factors influenced treatment receipt. - Statistical methods included chi-square tests and logistic regression, controlling for various patient characteristics, and examining potential disparities by the	- 996,641 individuals included - Patients were included if they had a relevant OUD diagnosis, had not received specific treatments prior to diagnosis, and maintained continuous Medicaid enrollment around their diagnosis time. - Ages between 18-64	OUD	- 13.6% received buprenorphine and 2.1% received Vivitrol within 180 days of their first OUD diagnosis. - Significant racial-ethnic disparities in the receipt of buprenorphine and Vivitrol among Medicaid patients diagnosed with OUD were noted. - Non-Hispanic White patients had higher rates of treatment compared to other racial groups, with statistically significant lower receipt rates noted among non-Hispanic Black, American Indian/Alaskan Native/Asian/Hawaiian/Pacific Islanders, Hispanic, and other/unknown race/ethnicity groups. - Multivariable analysis confirmed these disparities, showing reduced odds of receiving buprenorphine or Vivitrol for non-White groups compared to non-Hispanic Whites. - Males and English speakers had higher odds of receiving treatments. - Disparities were found to persist across all 5 settings examined, suggesting that health equity of OUD treatment should be prioritized across multiple health care settings.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			setting of the first OUD diagnosis in 5 settings (hospitalizations, physician and advanced practitioner service, substance use and mental health treatment services, hospital outpatient and emergency department (ED) service, and other settings).				
Duvivier et al., 2017	- South-west, Midwest and Great Lakes regions - Tribal	Develop effective pharmacy-based interventions that reduce harm from opioid use disorders, encompassing responsible opioid prescribing, expanded access to MAT, naloxone distribution, and community interventions.	- Review article/Report - Outcomes assessment/program evaluation review	- Clinical pharmacists who practice in Indian Health Service (IHS) locations in specific areas. - Number of participants not listed.	OUD	- Pursued advanced training in responsible opioid prescribing, enhanced services for broader access to MAT for AI/AN, and improved availability of naloxone for reversing opioid overdoses. - Used novel approaches through patient consultation and education from within the pharmacy, patient management in non-cancer pain clinics and care coordination through MAT programs. - Advocated for expanded MAT in IHS including buprenorphine and naltrexone. - Recognized the bio-psycho-social-spiritual nature of chronic pain and designed individualized multimodal approaches to pain treatment that include physical and occupational therapy, behavioral health, interventional injection treatments, acupuncture and nutritional counseling for safe and effective treatment plans that minimize opioid abuse risk. - Participants developed a comprehensive training program and tools for 350 law enforcement officers serving tribal communities and conducting a mass Naloxone dispensing initiative. - Developed culturally sensitive materials to increase trust and reduce the negative stigma of OUD. - Completed training to improve motivational interviewing techniques, health coaching, and	N/A

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
						skills to establish an open, supportive, and nonjudgmental relationship is the key to reducing stigma in AI/AN.	
El Ibrahimi et al., 2022	-Oregon - Urban	- Evaluated the characteristics of Medicaid patients admitted to SUD treatment programs for concurrent heroin and methamphetamine use compared to those admitted solely for heroin use.	- Quantitative methods - Cross-sectional design to compare demographics, type of treatment and substance use characteristics between the two groups. - Logistic regression models to assess differences in odds of opioid-related and all-cause adverse effects. - Data from the Oregon Treatment Episode Data Set linked with Medicaid enrollment, and medical and pharmacy claims describing substances used because it contains many addiction-related details such as the specific substance, route of administration (e.g., injection), use duration, and intensity between 2014-2017. - Used Medicaid medical and pharmacy claims to describe other patient characteristics such	- N = 3802 included of which 319 patients were AI/AN who entered treatment for heroin and meth and those admitted for heroin only	Heroin (OUD) and Meth	- 53% were admitted for combined heroin and methamphetamine use. - Heroin and meth group were found to be generally younger, more likely female, and predominantly White or AI/AN, with more comorbid conditions than those admitted for heroin use only. - Heroin and meth group were less likely to receive any MOUD (56% vs 75%) and had shorter MOUD treatment durations (188 vs. 265 days). - Buprenorphine use was higher among this group (28.1% vs 24.2%), whereas methadone use was lower (39.9% vs 62.5%). - Heroin and meth group began substance use at a younger age and had higher frequencies of use and injection. - 17% lower odds of opioid use disorder-related adverse events and 52% higher odds of all-cause adverse events compared to those admitted for heroin only.	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			as comorbidities, OUD treatment medications, duration, and setting. - Hospital and emergency department claims served to identify opioid-related events and other adverse health care events.				
Hirchak et al., 2022	- Across U.S.	- Examine the disparities in the availability of national prescribers with waivers to prescribe Medication for Opioid Use Disorder (MOUD), focusing on how demographic characteristics and the racial and ethnic composition of ZIP codes influence access to such prescribers across the United States.	- Quantitative methods - Cross-sectional study - Utilizing data from the Drug Enforcement Administration (DEA) Registration Controlled Substances Act Information Database for individual and neighborhood-level indicators that may act as barriers or facilitators to accessing treatment. - Association between geographic areas and the number of buprenorphine-waivered prescribers, considering factors like urban/rural designation, insurance status, and socioeconomic characteristics, to better understand and address disparities in treatment access.	- n = 28,993 including 112 AI/AN - Online database that included data on type of business type (e.g., hospital), drug schedules, names and addresses of prescribers, and practitioner type.	OUD	- Among AI/AN and Black/African American neighborhoods, availability of waivered prescribers may not be a primary barrier, however, availability of waivered prescribers and prescribing may be an obstacle for Hispanic/Latinx and rural communities. - Non-Hispanic White (NHW) populations were dominant across all rurality categories, ranging from 80% in metropolitan areas to 94% in rural areas. - Predominantly AI/AN neighborhoods had the highest rate of DEA-waivered prescribers. - Significant interaction between neighborhood type and predominant racial group affecting the rates of DEA-waivered prescribers. - AI/AN neighborhoods generally showed higher availability, especially in less urbanized areas. - DC, Massachusetts, and Rhode Island had the highest per capita numbers of DEA-waivered prescribers, with northeastern states generally having higher levels of such prescribers.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
Katzman et al., 2020	- New Mexico, Washington - Tribal	- Assess the effectiveness of Pain Skills Intensive trainings (PSIs) as an adjunct to the Indian Health Service (IHS) and the collaboration of Chronic Pain and Opioid Management TeleECHO Program (ECHO Pain).	- Mixed methods - Continuing medical education (CME) surveys and in-person focus groups at the end of the training.	- 38 IHS clinicians trained in Pain Skills Intensives (PSI) completed surveys and 9 participated in follow-up focus groups.	OUD	- Rated hands-on skills highly with a 99% rating "competent" to "very competent". - Reported above-average confidence in implementing hands-on pain skills and safe opioid prescribing - Provide critical competencies in assessment and screening, pain management and communication skills. - Rurality sufficiently limited access to ancillary and complementary services provided and reported the need for additional training in integrated behavioral health into practice. - Inclusion and respect were key themes identified by non-prescribing clinicians in Albuquerque, highlighting it fostered a successful learning environment increased their confidence in interacting across disciplines and encouraged their participation in future teleECHO sessions. - Information on MAT is crucial to the successful treatment of chronic pain and OUD.	4
Kelley et al., 2021	- Utah - Rural	- Evaluate clinic awareness and access to treatment for OUD among pregnant women in three rural American Indian U.S. counties.	- Quantitative methods - Non-randomized experimental study - Utilized unannounced standardized patients (USPs) methodology to examine access to OUD treatment in appointments for buprenorphine treatment, clinic scheduling practices, and referral to treatment.	- N = 28 Primary care and OB/GYN clinics that provide prenatal care.	OUD	- Rural American Indian and white pregnant women with OUD face barriers to access to care. - Buprenorphine treatment was offered in 26.5% of calls, but only 17.6% scheduled an appointment. - Clinics with a SAMHSA-listed prescriber offered treatment 50% of the time compared to 7.7% for clinics without a prescriber. - Major reasons for not offering appointments included lack of a prescriber (75%), discomfort in treating pregnant patients with OUD (17.9%), Medicaid not accepted (7.1%), and unknown provider availability (3.6%). - When treatment was offered, the median wait time for an appointment was 2.5 days. Most clinics (85.7%) provided referrals when they did not offer buprenorphine treatment, although many referrals were to facilities that did not offer OUD treatment themselves. - Referrals sometimes crossed state lines and involved significant travel distances (up to 126 miles) and times (up to 2 hours and 12 minutes).	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
						- No significant differences in treatment access between white and AI profiles according to the outcome measures.	
Krawczyk et al., 2021	- Across U.S. - Tribal	- Investigate the extent to which substance use treatment facilities that specifically serve AI/AN clients offer MOUD in comparison to facilities that do not focus specifically on this demographic. - Explore individual, clinical, and structural factors that impact the use of MOUD among AI/ANs seeking treatment for opioid use disorder. - Test the hypothesis that AI/ANs have lower access to MOUD at both the facility and client levels compared to clients of other races.	- Quantitative methods - Analysis using two national databases - the 2018 NSSATS (information on the characteristics of substance use treatment facilities, including types of medications offered) and the 2017 TEDS-A (detailed characteristics of clients admitted to specialty substance use treatment programs) to estimate the extent to which MOUD is available and used among AI/ANs across the U.S.	- N = 8,136 facilities serving AI/AN	OUD	- Facilities serving AI/AN clients had lower rates of agonist maintenance therapy like methadone or buprenorphine (22.39% vs. 27.60%). - Facilities operated by tribal governments and those with staff speaking Native languages were less likely to offer agonist maintenance (possibly due to lack of fit of evidence-based practices to community/tribal customs and culture). - Only 1.19% of admissions for OUD were AI/AN who were more likely to be younger, have less education, be unemployed, live in unstable housing conditions, and primarily use prescription opioids. - AI/ANs had slightly higher overall rates of MOUD use (40.04% vs. 38.63%) and were more likely to receive MOUD (adjusted OR: 1.53) compared to other racial groups when adjusted for various factors. - Common factors increasing the likelihood of MOUD receipt included being older, female, a primary heroin user, and having a previous treatment history. - Unique to AI/ANs, identifying as Hispanic increased MOUD likelihood. - AI/ANs were less likely to receive MOUD in the South. - Factors such as homelessness, recent arrests, and co-use of substances like alcohol and benzodiazepines decreased the likelihood.	5
Lillie et al., 2021	- Alaska - Tribal	- Examine variables associated with buprenorphine and naloxone retention among AN/AI people with OUD.	- Quantitative methods - Cohort study of N = 240 AI/AN from EHR data between 2015-2019.	- Patients from Anchorage and the surrounding 50 miles in the database who received buprenorphine/ naloxone and had a	OUD	- Younger patients and those with co-occurring/poly-substance use were at higher risk of discontinuing buprenorphine/naloxone treatment for OUD in this population of AN/AI people. - Having a mood/anxiety disorder was associated with better retention rates, possibly due to	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			- Gathered data from the electronic health record - Survival analysis to explore predictors.	preexisting OUD diagnosis between January 1, 2015, to December 31, 2019 - Included individuals who received 2 or more prescriptions for buprenorphine/naloxone to account for misclassification or mistaken prescriptions.		continued mental health support helping to maintain treatment engagement.	
Marotta et al., 2020	- Across U.S. - Not specified	- Investigate factors associated with discharge from Opioid Agonist Therapy (OAT) due to incarceration.	- Quantitative methods - Analysis of TEDS-D data set from 2015 - Multinomial regression to determine how demographic variables, prior arrest history, referral sources, types of drugs used, length of prior treatment, and intravenous drug use influence the likelihood of being discharged from OAT because of incarceration, compared to completing treatment or being discharged for other reasons.	- N = 64,331 treatment discharges in 43 states in 2015.	OUD	- Native Americans were at greater risk of discharge from OAT due to incarceration compared to Whites. - Substance use like heroin, benzodiazepines, synthetic opioids, cocaine, and non-prescription methadone, were linked to a higher risk of discharge from OAT due to incarceration, particularly for those reporting intravenous drug use and co-morbid psychiatric issues. - Unemployment was linked with an increased risk of discharge due to incarceration. - Drug courts could help reduce attrition from OAT due to incarceration by offering treatment instead of jail for drug-related offences, but most do not provide necessary access to medications like Methadone or Buprenorphine.	4
Morones et al., 2021	-Arizona - Tribal	- Evaluate and implement community-based actions to address the opioid crisis in AI/AN communities served by the Phoenix Area IHS,	- Review article/Report - Looks at the DEHS use of the *Strategy to Combat Opioid Abuse, Misuse, and Overdose: A Framework Based on*	- N/A	OUD	- Suggests equipping first responders with naloxone, particularly in rural areas where they may face longer response times to mitigate the impact of prescription opioid overdoses. - Several of the Phoenix area tribal health care facilities were not able to access MAT training through IHS because they manage their health services and are no longer an IHS health care	N/A

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		using a framework based on the U.S. Department of Health and Human Services' Five-Point Strategy to Combat Opioid Abuse, Misuse, and Overdose.	*the Five Point Strategy* template			facility. DEHS staff facilitated an arrangement with the state resources and university partners to provide MAT training to health care professionals at these facilities.	
Mpofu et al., 2021	- Across U.S. - Tribal	- Review emerging evidence and training needs in managing OUD among rural AI/AN communities.	- Review article/Report - Scoping systematic review to profile the evidence on any gaps and opportunities in OUD care, prevention, and treatment within rural AI/AN communities	- N = 8 studies that focused on OUD among rural AI/AN communities that studied prevention, treatment and care between 2009-2020. - Met PRISMA quality standards	OUD	- Six of eight of the studies (75%) were surveys with community members and other stakeholders on OUD in rural AI/AN communities rather than active interventions. - Five out of eight of the studies (63%) reported a preference for culturally grounded health and wellness interventions with rural AI/AN (involving families, and community interventionists, utilizing community reinforcement approaches. - Three of eight studies (37.5%) reported a need for the cultural adaptation of MAT. - One of eight studies (12.5%) proposed to use culturally adapted contingency management behavioral approaches for OUD treatment.	5
Nalven et al., 2021	- Across U.S. - Not specifie d	- Examine the inclusion of diverse groups in U.S. randomized clinical trials that assess pharmacological treatments for OUD (i.e., methadone, buprenorphine, or naltrexone), specifically focusing on differences across sex/gender, race/ethnicity, and socioeconomic status (SES).	- Review article/Report - Systematic review of 567 articles to examine how diverse groups have been included in randomized clinical trials in the U.S. pharmacological treatments for OUDs.	- N = 50 full-text articles were reviewed that reported in English, in the U.S. and assigned at least five participants per condition to test the efficacy of methadone, buprenorphine, or naltrexone for OUD; and review of at least one opioid use outcome along with diverse groups that were included in RCTs for MAT.	OUD	- Representation of diverse backgrounds in terms of sex/gender, race/ethnicity and SES was inconsistent and not representative, with a majority of participants being male and White. - Articles often reported some SES indicators like employment, income, or homelessness and showed samples that represented lower SES populations who also experienced significant health disparities. - There is a critical need for subgroup analyses to understand how different identities (e.g., sex, race, SES) interact and affect responses to pharmacological treatments. - Underrepresentation of AI/AN in studies on OUD, despite these groups experiencing higher rates of opioid misuse and disproportionate health disparities related to OUD.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
Novins et al., 2011	- Across U.S. - Tribal	- Analyze debates on the effectiveness and cultural fit of substance abuse treatments for AI/AN communities, discussing the integration of traditional practices with EBTs and 12-step programs. - Expand the conversation to include cultural adaptation and resource development necessary to enhance treatment efficacy for these communities.	- Mixed methods - Prevalence study that discusses community participation and research collaboration - Convened an advisory board to discuss controversies that consisted of researchers, and experts from substance abuse programs serving AI/AN.	- Not specified; AI/AN substance use	All substances including opioids	- Importance of considering unique community, policy, and practice contexts in AI/AN communities to improve service quality - Importance of linking research with practice, consumer participation, and community-based research collaboration - Shared concerns between AI/AN and non-AI/AN communities regarding the lack of flexibility in EBTs (such as naltrexone, methadone and buprenorphine and medications to treat comorbid psychiatric conditions) and limited programmatic resources - Highlights the need for tribally specific approaches in substance abuse services for AI/AN communities, considering their unique historical, political, and cultural contexts.	4
Novins et al, 2016	- Across U.S. - Tribal	- Examine the depth of engagement with EBTs in substance abuse treatment programs serving AI/AN communities.	- Mixed methods - Included 3 parts in the study; an advisory board to identify key issues in the study process, qualitative case studies and conducting a national survey of AI/AN substance abuse programs.	- N = 18 qualitative case studies of substance use programs - N = 192 surveys completed - Identified programs that provided substance abuse treatment services to AI/AN communities and then identified a clinical administrator/senior clinical staff to participate in survey.	All substance use including opioids	- CBT (82.2%), Motivational Interviewing (68.6%) and Relapse Prevention Therapy (66.8%) were the most implemented EBTs in substance abuse AI/AN programs (others included 12-Step Facilitation and Matrix Model). - However, only MI and Relapse Prevention Therapy were found as culturally appropriate by programs that had implemented them. - Found the use of medication EBTs for relapse and withdrawal to be particularly uncommon in AI/AN programs, further exploration needed. - Assessed among EBTs, how much engagement there was with MAT; medications for comorbidity were most implemented MAT and medication EBTs were higher in programs receiving Medicaid.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
O'Malley et al., 2008	- Alaska - Rural	- Evaluate the efficacy of naltrexone alone and in combination with sertraline among Alaska Natives and other Alaskans in rural areas.	- Quantitative methods - Randomised controlled trial with 101 Alaskans with alcohol dependence (68 AI/AN and other Alaskans living in rural areas). Participants received 16 weeks of either (1) placebo (placebo naltrexone + placebo sertraline), (2) naltrexone monotherapy (50 mg naltrexone + sertraline placebo) and (3) naltrexone + sertraline (100 mg) plus nine sessions of medical management and supportive advice.	- N =101 Alaskans, including 68 AI/AN - Alaskans with alcohol dependence.	Alcohol dependence	- Naltrexone found to be effective treating alcoholism in remote and rural communities, with evidence of benefit for AI/AN (significantly higher total abstinence).	5
Pro et al., 2022	- Across U.S.	- Evaluate the association between factors of pain medicine, state laws and OUD treatment and positive response using national data.	- Quantitative methods - Cross sectional study - Use of 2018 TEDS-D data to identify outpatient treatment episodes with heroin or other opioids indicated as primary substances of use at treatment admission and with complete data for all study variables.	- N = 162,846 opioid treatment episodes, 1.28% AI/AN. - Response to positive opioid treatment at 2 time points during treatment admission and discharge. - Positive response included reduced use between admission and discharge or no use at admission and discharge.	OUD	- States with low community distress found AI/AN treatment episodes to be 5 times the odds of positive response in high distress communities indicating lower community distress as a strong predictor of better treatment outcomes in AI/AN.	5
Pro et al., 2020	- Across U.S.	- Evaluate the relationship between MAT and reductions in opioid use from the start to the end of outpatient	- Quantitative methods - Cross sectional - 2015-2017 TEDS-D data	- N = 242,547 Treatment episodes, 3717 AI/AN. - Only outpatient treatment episodes excluding inpatient	OUD	- MAT was significantly and positively associated with reduction in opioid use strongest among AI/AN women and AI/AN men. - Explained by recent efforts of IHS investment in resources to improve OUD treatment and preference for cultural and spiritual framing of MAT participation.	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		treatment, and to investigate whether this relationship varies by race/ethnicity and gender.		detoxification/residential treatment.			
Pro & Zaller 2020	- Across U.S.	- Quantitatively analyze the association between racialized experiences and discrimination and methadone maintenance therapy (MMT) between racial/ethnic groups.	- Quantitative methods - Prevalence study - Multivariable logistic regression analysis	- N = 766 out of which 2.64% were AIAN - Only restricted to individuals with a lifetime OUD (heroin use disorder and opioid use disorder) who had ever used MMT.	OUD	- MMT status was strongly associated with racial discrimination among AI/AN that indicated to be an additional barrier to health services utilization among AI/AN for OUD Tx. - AI/AN who had used MMT had over thirty times the odds of racial discrimination, compared to their non-MMT counterparts.	5
Rieckmann et al., 2017	- Across U.S.	- Evaluate MAT for substance use for AI/AN and barriers at a broader level impacting these groups by reviewing substance use programs in the country.	- Quantitative methods - Prevalence study through a survey about use of MAT in substance use programs. - Multivariate logistic regression using a stratified sampling approach.	- N = 192 substance abuse Tx programs. - Clinical administrators and staff in substance abuse treatment programs serving AI/ANs use and perceive EBTs.	All substance use including OUD	- Study found a low rate of MAT implementation in the programs (only 25% of programs) highlighting racial disparities in access to MAT for AI/AN - Also, highlighted the important role of treatment culture and organizational fit in the implementation of MAT in treatment programs serving AI/AN populations. - Results also speak to the importance of adapting existing EBTs in a culturally competent way to best serve the needs of the AI/AN community.	5
Running Bear et al., 2022	- Alaska - Urban	- Examine risk and protective factors associated with readmission of patients for alcohol and opioid detoxification to allow for better interventions that focused on transitioning	- Quantitative methods - Prevalence study - Descriptive statistics for risk factors and inferential analysis.	- N = 1014 patients of which 690 were AI/AN - Data were reviewed from electronic medical records for admissions between 2012 and 2016 at an inpatient detoxification facility in Fairbanks, Alaska.	OUD and Alcohol use disorder	- AN/AI single male patients who were jobseekers were at a high risk for readmission but those with stable housing conditions were at a reduced risk. - Family involvement (extended family structure, home sharing responsibilities) in treatment (rather than in general) was found to be a strong protective factor against readmission for opioid and alcohol and interventions that promote this and social connectedness can be integral. - Single individuals who completed detoxification treatment indicated reduced readmission to opioid detox.	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		patients to long-term recovery.					
Tipps et al., 2018	- Across all U.S. - Tribal	- Examine opioid overdoses or OUD in Indian Country and lack of fiscal and policy resources in the Indian Country as an epidemic.	- Quantitative methods - Prevalence study using death data from CDC to describe the extent of the epidemic in Indian Country - Research then looks into innovative medical and legal efforts by tribal nations to combat OUD	- Tribal nations opioid overdose deaths data from CDC	OUD	- Mortality rate due to opioid overdose increased over last 17 years and vary by state (higher mortality rates in Minnesota and Washington - mainly Pacific Northwest and Great Lakes region whereas Southwest - Arizona and New Mexico has lower rates). - Poverty in Northern Plains may have an impact on access to OUD tx. - Urban areas with higher AI/AN population had higher mortality rates. - IHS responded with steps including establishing the Prescription Drug Abuse Workgroup to emphasize education, train and distribute naloxone to law enforcement and continued online opioid treatment training. - Drawbacks of the steps by IHS include inadequate staff, outdated equipment, failing to meet Medicare requirements limiting quality and effectiveness of programs, limiting MAT by location, need to restructure existing Tx programs to shifts in types of substances used by tribe members in opioid use. - Programs that offered cultural and local support on the reservation through encouragement to take ownership of opioid crisis as it impacts family, friends, neighbors building stronger bonds between community members.	5
Venner et al., 2018	- Across all U.S. - Reps from region/ states with high AI/AN - Urban	- Themes emerged from a NIDA meeting of AI/AN community stakeholder was convened to address barriers of MAT delivery and research pathways to address OUD related health	- Qualitative methods - A meeting discussion organized by two moderated panels providing AI/AN community views on MAT for OUD and models of substance use and recovery and the importance of cultural tailored	- Panel included diverse stakeholders (i.e., AI/AN community members, AI/AN and non-AI/AN providers and researchers)	OUD	- Themes that emerged included the need to integrate MAT with the holistic health of AI/AN, differences and conflicts in Western and AI/AN traditional healing in MAT, systemic barriers in MAT and improvements needed in MAT research. - Utilization of Indigenous healing approaches, “two-eyed seeing” in Western MAT interventions so healers can “translate” these treatments to AI/AN. - Eliciting views and perspectives from Indigenous stakeholders such as elders,	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		disparities among AI/ANs.	programs and barriers in MAT for AI/ANs.			traditional healers, etc. following CPBR can be crucial. - MAT showed better outcomes in treating OUD than treatment without medication or abstinence-based ones along with early adjunctive psychological counseling to balance wellness and motivation.	
Yang et al., 2020	- Across U.S.	- Evaluate how buprenorphine and methadone treatment to manage OUD vary in terms of geographic, organizational, and payment characteristics.	- Quantitative methods - Prevalence study through survey data from questionnaires, telephone interviews and web surveys. - Secondary analyses of the National Survey of Substance Abuse Treatment Services (NSSATS) from 2007–16 using bivariate descriptive statistics of treatment services that offered buprenorphine and methadone treatment. - Use of multiple logistic regression.	- N = 136,143 responses from data from the 2007–16 of N-SSATS. - Respondents categorized by location based on Census Bureau Divisions. - Included private, non-profit, state, local and tribal government facilities. - Facilities that provide sliding fee scale, accepted cash private insurance, Medicare, Medicaid state and federal Military insurance were included.	OUD	- Buprenorphine was found to be increasingly offered in facilities across all divisions, however, remains low outside of the northeast region. - Treatment facilities run by IHS or tribal governments that offered buprenorphine remained low, highlighting the disparity in treating Native Americans. - Facilities offering payment assistance were less likely to offer buprenorphine. - Facilities accepting Medicaid payments were more likely to offer Methadone treatment.	5
Zeledon et al., 2020	- Californi a - Tribal	- Analyze a community- based needs assessment of strengths and weakness among AI/AN members in CA to identify facilitators and barriers to treatment for OUD.	- Qualitative methods - Through Key Informant Interviews (KIIs) - AI/AN substance use care providers that had experience in programs that serve AI/AN people and utilize MAT were interviewed about barriers to accessing care, risk and protective factors, community substance use description and	- N = 21 participants from AI/AN SUD specialists who have experience in AI/AN programs that utilize MAT.	OUD	- Found an increase in SUD and OUD in AI/AN communities highlighting the importance of comprehensive and culturally centered care. - Using residential treatment or aftercare services that include culturally adapted programs to improve the effectiveness of MAT. - Many are unable to access MAT and comparable services due to the location. - Participants highlighted the importance of the system of care approach through a strong patient-provider relationship through active communication and integration of multi-disciplinary providers in AI/AN client treatment plans. - Participants recommended traditional community healers become part of the MAT services to use cultural healing through the	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			SUD and OUD services available.			spiritual, mental and physical strengths of AI/AN clients.	
Zeledon et al., 2022	- California - Urban and Tribal	- Analyze the perspectives of AI/ANs in California to assess cultural and traditional healing treatment modalities for OUD treatment.	- Qualitative methods - Research through 21 focus groups across 10 counties in 20 urban and tribal regions of California	- N = 163 AI/AN participants in California who have been impacted by OUD - Adults (18–65 years) who met the selection criteria of self-identifying as AI/AN and being impacted by OUD in their community or actively being in OUD recovery and living in a local AI/AN community.	OUD	- MAT for OUD should include cultural components that resonate with the AI/AN communities. - Components include developing a connection with culture, spreading awareness of OUD treatment and building a sense of belonging were found to be protective factors for OUD treatment (e.g. using Western and Indigenous practices, traditional healers and healing cultural traditions such as sweat lodges, drumming, etc.).	5

APPENDIX B

Search Strategies by Database

PubMed

- **Database:** PubMed
- **Date Searched:** September 30, 2022
- **Search type:** All fields
- **Search String Used:**
    - "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
    - "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
    - "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

CINAHL

- **Database:** EBSCO

- **Date Searched:** September 29, 2022
- **Search type:** All fields
- **Search String Used:**
    - "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
    - "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
    - "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

PsycINFO

- **Database:** EBSCO
- **Date Searched:** September 30, 2022
- **Search type:** All fields
- **Search String Used:**

- "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
- "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
- "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

Academic Search Complete

- **Database:** EBSCO
- **Date Searched:** September 28, 2022
- **Search type:** All fields
- **Search String Used:**
  - "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
  - "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use

disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"

- "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

APPENDIX C

Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-SCR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Page 1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Pages 3-5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Pages 5-6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Page 6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Pages 7-8
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Pages 7-8; Appendix B
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Pages 8-9
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and	Page 9

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Pages 11-12
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not Applicable
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 10
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 10
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Page 11-12
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not Applicable
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Pages 19-26, Table 1
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Pages 13-18
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Pages 27-30
Limitations	20	Discuss the limitations of the scoping review process.	Pages 30-31
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Page 31-32
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Page 32

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.